

THE  
EXPERIENCED FARMER,  
AN ENTIRE NEW WORK,  
IN WHICH THE WHOLE SYSTEM OF  
AGRICULTURE, HUSBANDRY,  
AND  
BREEDING OF CATTLE,  
IS EXPLAINED AND COPIOUSLY ENLARGED UPON;  
AND  
THE BEST METHODS, WITH THE MOST RECENT  
IMPROVEMENTS, POINTED OUT.

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BY RICHARD PARKINSON,  
OF DONCASTER IN THE COUNTY OF YORK.

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IN TWO VOLUMES.

VOL. II.

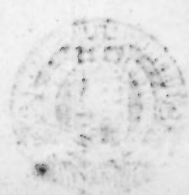
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**THE  
EXPERIENCED FARMER.**

**SECTION L.**

*The Sort of Land to be pared and burned; the  
Uses and Imperfections.*

**T**HE sort of land generally thought to stand in need of paring and burning is that which cannot easily be pulverised by other means, such as moss, rushes, and coarse grasses of all kinds. Land of good quality of any soil, if it has been eaten by sheep, seldom requires paring and burning; for sheep, when mixed with cattle and horses, eat land so even that the sward may easily be pulverised. In that case it may be unnecessary to pare and burn.

Moor-land of all sorts ought to be pared and burned. Heath-land should likewise be pared and burned, on account of the sort of grass it produces, the stems and roots of which are like wire, and would not rot for many years: and when the roots of grass remain in land, they impede the growth of corn, turnips, &c.; as may be easily conceived from their robbing the earth of the nutritious particles which should be diverted into another channel. These roots are very stubborn, and not easily destroyed, even when the land is sown with turnips; for, when the turnips become sufficiently large to admit of the hoe, by running amongst them they are very troublesome, and cannot be removed.

The grass-roots also serve as a harbour for worms, where they breed and increase in a very great degree; and when the land is sown with corn or turnips, the grass-roots are so entangled, that the roots in searching after the worms pull up the corn and turnips.

It is this which fixes so bad a character  
on

on the poor rooks, who certainly do not feed on the roots of corn, turnips, &c. : but they are under the necessity of pulling them up in search of their prey—the husbandman's enemy. In summer, rooks will be equally busy on the swarth in search of worms and grubs ; for which we are under obligations which we have seldom the gratitude to acknowledge. Most husbandmen, indeed, hate a rook as much as they do the fox.

The only effectual method to clear land when injured by roots, worms, &c. is to pare and burn. Burning destroys worms, old and young, together with their eggs. It also destroys the moss, and grass as well as roots. These roots, in addition to the mischiefs already mentioned, keep the land light, by perforating it in such a multitude of places ; by which means the air is admitted, and a greater fermentation is occasioned than is necessary to the vegetation of the plant ; and the land rises in blisters.

The ashes procured by burning, and when the fires are made on the land, serve

the purpose of manure for two or three crops : and were the straw made into manure, and returned to the land, even the poorest of the above soils would receive considerable benefit, and turn out of great advantage to the farmer ; as by the time the ashes most probably would not be exhausted, and, when mingled with the other manure, would preserve the oily quality in which consists their virtue.

We well know that crops of any kind lessen the fertility of the soil, and will in time exhaust the richest, if not supported and renewed by the assistance of manure. As to poor soils, they would, unless assisted by art, soon be so worn out as to produce nothing but weeds, and often little of them. As we have such perfect conviction that the use of manure properly applied creates abundance on all soils ; it follows, that, if paring and burning causes more manure to be made, it is proper paring and burning should be more used than it is at present. I think every farmer will allow that the loss of one crop frequently occasions the loss of many ;

many ; as it certainly diminishes the dunghill : but what adds to the dunghill will not impoverish the land, provided it is returned as it should be. Some are of opinion that paring and burning diminishes the land : and so it must in some degree, though it may leave a larger portion of vegetative soil. Were the sward taken from any field, laid in heaps, and mixed with manure sufficient to cause a fermentation, which would in a degree destroy those reptiles and insects so injurious to all crops ; that would be of greater advantage to the land than the present mode of ploughing up old swards without paring and burning : for, in that case, the greater the plenty of worms, &c. the better, as their carcases would enrich the manure. I own that the expence of labour is an objection to this scheme, and that it would require a large quantity of manure to prepare a poor sort of turf for readily working down in a proper manner to be laid on land, to make it ready for corn ; for, if it were not thoroughly worked into mould, it would



prove injurious instead of being beneficial to the crop.

It may be said, that this method would raise a large hill of turf. But it is to be recollected, that the sort of turf meant has but little fertility in it without fermentation; and more of it would not be required than just enough to imbibe the superfluous juices draining from the manure. A greater quantity would be of detriment instead of benefit; for, I have turned manure over in a fold-yard, in a dry season, where a deal of straw perfectly dry had been strewed in the spring months on the top of the dunghill; and from there being a greater proportion of dry straw than the moisture absorbed by the dunghill could properly ferment, the manure, when carted away, was more dry than when it was first turned over. The heat of a hay-stack will cause the watery particles to evaporate perceptibly; and, by turning the manure I speak of, it was so much injured as to be considerably worse for the expence bestowed.

Peat, turf, morass, are one kind of soil:  
though

though there is some difference in the particular forts, they require the same management. Heath-land, although it varies very much, producing shear-grass, on some parts moss, on others a sort of pry-grass, yet requires the same management. These are all proper lands to be pared and burned.

If you have any sort of soil in nature so poor as to convince you it will not bring a crop without artificial assistance, and you can find turf or sward upon it sufficient to pare and burn, and by that operation improve the land so much as to enable it to bear a crop, which otherwise it could not have done; who can find fault with such proceeding? I could mention innumerable instances where paring and burning has succeeded most wonderfully. Sometimes the tenant, through poverty, is not able to bear the expence: but mostly the aversion which gentlemen or their agents have so unaccountably contracted against this practice, prevents the more general use of it. It is necessary to say, that you must take care that the fods burn not too rapidly: for, if

they smother gently, the ashes will retain much of the oil which by an intense fire would evaporate. It is adviseable to divide the fods into a number of hillocks; as, wherever they are burnt, you may be certain of a good crop from the earth's receiving the oil which oozes out during the operation, and which the land will retain for two or three crops.

Though this practice of paring and burning has met with so much opposition, I cannot perceive any injury a landlord can sustain by it. Barren soils are rendered fertile by it: and no tenant would offer to pare and burn a good soil, as that would be a waste of time and money.

When land that has been pared and burnt is laid down, supposing it even sown with seed of the same sort of grafs; it will grow much finer, from the earth's being so easily pulverized, and of course admitting a free vegetation.

Some men do their business in so slovenly a manner, that they may plough a piece of land for six or seven crops, without once pulverizing

pulverizing it sufficiently. And they will sow the crops one after another in this manner, because the land is fresh : but in all probability there will not have been one really good crop amongst the whole.

Let us now suppose that we plough heath-land without paring and burning, and that we sow it with oats. A very small crop only can be expected. If you then fallow and sow with turnips, none can be expected unless you manure ; and no manure worth mentioning has been made from the produce of the land itself. But it must be procured, or there will be no turnips, and very little barley : and, if then sown with clover, little of that can be expected.

On the other hand, if pared and burned, and sown with turnips, the crop will almost to a certainty be a good one ; for they delight in ashes. If the turnips be eaten off by sheep, your oats and barley will be excellent : and if the field be afterwards laid down with seeds, you may rely upon an abundant produce. If you have clover, and mow it, you may expect good wheat  
after.

after. Then fallow for turnips: you will have the land's own produce to furnish six loads of manure per acre, which, properly applied, will ensure a good crop. This is the best method of improving poor land, and the least expensive of any I know. And if rich land be over-run with coarse grass, and be infested with grubs, worms, &c. no method will so effectually destroy them as paring and burning. Should any of the grubs or worms even escape the fire, they have such an antipathy to ashes that they must either change their residence or perish with hunger.

I have treated of the culture of potatoes in Section XV. I am of opinion that potatoes would succeed extremely well after paring and burning. I never tried the experiment, nor do I know any one who has; but where land is full of grass-roots, it is cheaper to burn than collect and remove them; and, in a bad season for getting grass-roots or weeds from the land, burning before the potatoes are set I think to be the best method. If potatoes are set the last week in May, or the first week in June, it would



would be early enough to have a good crop. If a man wants present profit, he cannot do better than set potatoes: if he wishes to improve the land, let him sow turnips, and eat them off with sheep. If the tops of potatoes, instead of being suffered to remain on the ground until they perish, were cut in time, it is certain they would afford food for numbers of cattle; and you might continue cutting them through the summer for that purpose, and thus raise a large dung-hill for the benefit of the land; but it would injure the potatoe-root.

I have already observed, that moor-land is of the same kind as heath: and I would recommend, after paring and burning, a crop of rape to stand for seed. There will be sufficient time for that purpose; for, if it be sown in August, it will be early enough. I have seen a very good crop, the seed of which was not sown before September. The leaves of rape, by smothering and by falling in such abundance upon the land, enrich it (by the oil they contain) in almost as great a degree as the seed impoverishes it:  
SECTION and

and were the ground immediately cleared of the rape-straw, roots, stalks, &c. ; ploughed, freed from weeds and rubbish, properly pulverized, sufficiently limed, and then sown with wheat ; it would ensure a good crop. This sort of land may be carried on five or six years by lime, before you have it in grass again : and were you to debit the rest of the farm with the produce of it in the article of manure, there would be at least twelve loads due to lay upon it with the seeds, or after the first year of depasturing it.

In very strong clay, ashes will prevent that close adhesion of the parts which is so great an enemy to vegetation. In a sandy soil, ashes, lime, and manure would furnish a compost that would produce every useful grain and herb cultivated in England.

## SECTION LI.

*Surface-Draining, and Under-Draining;  
Uses of them; what Land most proper for  
each.*

**SURFACE-DRAINING**, though in general very badly executed, is perhaps one of the greatest improvements in agriculture and grazing that has been made of late years. Unless land be laid properly dry, it is scarcely possible that any useful plant can prosper, or the useless be destroyed. Rushes, for example, of which there are many thousand acres, spoiling land which might with great ease be freed from them by draining, are suffered to grow from neglecting to apply this simple remedy.

Every man who is troubled with rushes upon his land, complains of their growth: but few think of the cause of their propagation.

Sometimes, indeed, it is useful to the farmer

mer to have rushes on his farm. The landlord who is averse to the breaking up of land suffers the tenant to plough a rushy piece: and if it be afterwards properly drained, and finally laid down with seeds, the rushes will be nearly destroyed.

Rushes will not grow, or, at least, not arrive at any degree of perfection without moisture. Either they must be fed with water from the surface of the earth, or derive nourishment from springs at a small depth. A dry soil will not produce them. I had a proof of this upon the farm at Aby-Grange before-mentioned. A piece of land being very rushy, my father was permitted to plough it. The first crop was oats—the summer was remarkably dry. After the oats were got off, the land was harrowed, and sown with cole-seed, which produced the best crop I ever had seen, when sown so late in the season. We had frequently tried to raise cole before for sheep in the autumn, but it never came to perfection. I now know that we failed because we ploughed the ground a common depth, and did not sufficiently

sufficiently pulverize it. We relied upon the oats which were shaken out by the mowing, &c. growing and furnishing great part of the food to be raised for the sheep: but by ploughing so deep we had buried them. At that time I had no doubt but an oat would grow through a clod a foot thick! I agreed in opinion with farmers in that clayey country, who sow wheat in autumn; and, if the season proves dry, when they have moved clods with the plough, of eight or nine inches cube upon the wheat, wonder at seeing the crop so thin, and are puzzled to account for it.

But to return from this digression to our crop of cole with the shed oats, as also to the rushes. The cole and oats were eaten off by sheep, and the land fallowed, and sown with turnips. The next crop, to make the fallow, we ploughed cross-wise, in order to level the ground, as the furrows were very low, and the ridges very high. We then ploughed downwards; and, to pulverize the soil, made use of a pair of harrows with teeth like coulter, for which reason



reason we call them *coulter-teeth barrowes*. The land was harrowed across and in every direction with them, until they had divided the roots of the rushes into millions of plants; so that we took the best possible method to propagate those which the season had not been sufficiently dry to kill. The third ploughing we sowed turnips, and had a good crop, except on the top of the ridges, whence we had taken all the soil which had fallen into the furrows, leaving nothing but a hungry clay. I had not then seen roots of weeds raked up and carried off fallows. Therefore twitch-roots, rushes, and every noxious weed had liberty to grow, when the seeds were sown: but the land, being fresh, had very little couch-grass.

The next crop was barley with rye-grass and white-clover. I tried an experiment by sowing here and there a land without barley, to see whether it would be in a better state in future than those lands where barley had grown. But in two years the land *not sown* was scarcely to be distinguished from that which had been sown: a proof that, if  
barley

barley had been raised, and the straw returned to the land in manure, the soil, instead of receiving injury, would have been improved by it.

The rushes grew ten times thicker than before the land was ploughed, and spread all over it, ridges and all. I thought the whole field would turn out a bed of rushes: but I was most agreeably disappointed; for most of them died away before they came to any size. The getting rid of this troublesome weed is to be attributed to draining; by the furrows being so much raised, and the ridges ploughed down. The drains had been cleared out rather deeper than they had ever been, as a preventative against the rot in sheep; and by making new grips or drains, the land was laid fairly dry, sufficiently so at least to deprive the rushes of nourishment: of course they died away.

Some may start an objection, by saying, "Rushes grow upon dry land."—To appearance, I own, they sometimes do. The land may indeed be dry on the surface: but drain it properly and effectually,

and, depend upon it, you will destroy the rushes.

On a heath consisting of many hundred acres, in an elevated situation, water had been sought for by several expert and judicious workmen in the art of well-sinking. They had gone to a most extraordinary depth; but in vain. They were of opinion no water was to be found, unless they perforated the great abyfs; and therefore gave up the job.

In a short time after, some labourers were employed to open a stone-quarry; and after digging a very small depth, to their great amazement they found an excellent spring of water, so far perennial that it has never yet been known to fail. We may suppose our well-diggers had not consulted Doctor Halley on the origin of springs, or their surprise would have been less. For, though the rain easily penetrated the light soil of the heath; yet, trickling horizontally through the earth until it arrived at the stone-quarry, it there found a receptacle or basin capable of retaining it. And the further

ther waste and percolation of the water being stopped, it there formed a spring—a certain index of which was a parcel of rushes growing upon the spot.

It is allowed by all, that under-draining has done wonders in respect to improving land; but surface-draining would do *more*, were it well executed, viz. as deep. Surface-draining should not be too superficial; though the name seems to imply that the drains should be cut only deep enough just to let the water off. They must be made sufficiently deep to take that water from the roots, which otherwise lies there, starves the useful herb, and perhaps promotes the growth of the noxious weed. In this instance under-draining has the advantage of surface-draining. By the former method, the drain is cut deep enough to carry the soak or underwent away; but were they made as deep in surface-draining, it would answer the purpose, and it would take the water off much quicker; which is certainly an advantage. Though under-drains be constructed with the greatest possible care,

they are nevertheless liable to obstructions, which cannot be discovered without expensive search; but in surface-drains, as they lie open to the eye, any obstruction may immediately be removed at a very trifling expence, scarce worth mentioning: but under-draining properly executed is always the cheapest.

Some land subject to rot sheep, I think it beyond the art of man to drain sufficiently by under-drains to prevent that effect: but, with the exception of flooded land, there are few lands in the kingdom that may not be made sound by surface-draining properly executed. In land subject to partial overflows, surface-draining will be found useful, as, when the water subsides, the remains will thereby find a quick vent.

In all the flooded land I have seen, any hillock or rising ground was always the most fertile; the reason of which I take to be, that thence the water speedily runs off. In holes and low places the greatest quantity by far of the sediment and slime is deposited; and this sediment and slime  
are



are supposed to be the very quintessence of manure ; although we find those parts on which they have been deposited in the greatest abundance to be the most sterile in the meadow.

In respect to commons ; the irregularity in stocking, and the want of division-fences, make surface-draining exceedingly desirable. For ditches here might serve a double purpose, that of fences and drains ; they might divide land of different qualities ; as it often happens that some is fit for pasture, and other parts proper for the plough.

Proper draining may save some acres in a large field newly inclosed. In an arable field, how common is it to see, for the sake of making a fence straight, an acre of land rendered unfit to be ploughed ! In one not exceeding ten acres, I have seen this prove an absolute nuisance ; and the occupier had received advantage by leaving it to any other person who for the sake of the land would clear it of the weeds. The farmer manured, ploughed, sowed, harrowed year after year ; but reaped nothing. He had the

satisfaction of seeing it look black in fallow, and green with corn, turnips, &c.—Couch-grass indeed would give a verdure, but no profit: and the mischief is, that by ploughing in the customary manner the couch-roots are conveyed through the whole field, and plentifully spread by cross ploughing and harrowing.

When fences are made to inclose ground, they should always be so placed as to be proper for draining. Ditches are an outfall to either surface or under-draining: and as it is the custom to make under-drains much deeper than surface-drains, the outfall ought to be particularly attended to before either the one or the other is begun; for, if any kind of drain is not made with sufficient declivity, or the ditch not cut deep enough, the current will be stopped, and the drains rendered useless by the water stagnating, or flowing back when the outfall attains a level something above the mouth of the drain.

In very wet seasons under-drains are liable to blow up, unless a sufficient drip or fall  
is

is given. Therefore choose the lowest part of your ground to begin your outfall, which, as before observed, you will take care to make sufficiently deep and large to receive any extra quantity of water that can possibly fall. From your outfall you will proceed to work upwards with the number of drains necessary, always recollecting that the greater the drip or fall, the more rapid the current of water: and you may with very little trouble, by a common level, know to an inch the declivity you can give your drains of any sort. To be careful in the construction of your drains at first, is what I must particularly advise; as the want of precaution in this instance is often attended with a very heavy expence.

Sides of hills, where there is a natural outfall, are easily drained: it may be effectually done, at little expence, by under-draining. But where the land is nearly flat, much art and management is required. On such land surface-draining is certainly preferable: and if it be necessary to make your outfall so deep as to endanger cattle or sheep,

it may serve for a fence. The art of draining is carried to very great perfection in my native county of Lincoln, where the engineers now rival, if they do not excel, the Dutch.

In a flat country surface-drains may in very dry seasons be made useful, where there is an opportunity of conveying water so as to fill them; for in that case the soil is fed by the water which oozes from them. This method is practised in the north marshes of the county of Lincoln; and a constant supply of fresh water conveyed, when wanted, by *clovers* with gates or doors to keep up the water at proper times above the level of the grips or drains, which of course fills them, and feeds the land on each side.

There is a kind of boggy land, which cannot be drained by means of surface-drains: the soil is like batter, and would run side to side, and close them up in a few days, unless lined by some hard substance. But by under-drains it may be drained with ease; because there is generally a hard bottom to  
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be found at some distance from the surface; the pulpy part being occasioned by a strong spring at the head of the bog, from which the water continually oozes, and lodges in the porous parts, but does not sink to any considerable depth. Proper draining will render such ground firm and useful: but it will be necessary to cut so deep into the solid earth as to prevent the drains from ever overflowing, and the water from running under the boggy part.

Clay-lands are the most expensive to drain. They, like every other soil, may have springs at a small depth from the surface: in that case it is proper to make use of under-drains; for, as clay is of a cold nature, it cannot be kept too dry. But they will likewise require almost as many surface as under-drains to give them a proper degree of warmth, which they never can attain in their humid state; for clay, from the coherence and compactness of the parts, retains so much water as will prevent it for a long time soaking into the under-drains. On the other hand, unless properly broken, and  
tempered



tempered by manure, it becomes in a dry season too rigid, and chokes the plants. This double draining makes it expensive.

Some practise a method of draining land by laying it very high on the ridges, and very low and hollow in the furrows. I by no means approve of this; for, when the land is afterwards laid down for grass, it is attended with much more difficulty completely to drain it, than if it had been made only a little round upon the ridges. The furrows will retain water and continue swampy a long time, and produce rushes; and the high ridges must be cut through in many places; which creates expence, and wastes much herbage. It may not be unnecessary to observe, that where the ridges have been raised too high, and you wish to level the ground, you must begin to raise a small land in the furrow, and gather it larger and larger by degrees. By so doing you will make all parts of the land useful, and may drain with much greater ease. If you begin to throw the ridges down, and con-

tinue to do that, you will cover all the best soil with the bad.

When drains are obliged to be made very deep, which can seldom happen unless where they are the principal, or outfalls, roundish pebbles are the best materials to fill them up with to prevent accidents. But if such pebbles cannot easily be come at, any sort of stones may answer the purpose; as loose stones, of whatever figure they may be, can never adhere so closely as to prevent the passage of the water. With whatever materials you fill the drain, let it be dug square till within a few inches of the bottom; when you may contract it suddenly to a triangular form, like the ridge of a barn-roof inverted. But in all drains made with brickwork or masonry, the circular form is to be preferred; as angles are sure to impede the free discharge of soil, and render the drains liable to be choked. This circular form may be given in most soils by a spade made in the form of a tool much used by joiners, wood-carvers and other artificers, called a *gouge*, by the shoving of which a good workman

man will make at the bottom of the drain a semicircular concavity, preferable to any other figure for use.

Under-drains which run into the principal, or outfall, will be found in general to answer the purpose, if made from twelve to fourteen inches wide at top. You must carefully take off the sod, dig the necessary depth, and lastly, with your gouge-spade make the bottom from four to six inches deeper, of a semicircular concavity. Leave the drains open, until you see that you have got a sufficient drip for the current of the water: then take the sod, and lay it grass-side downwards over the top of the narrow part: throw in mould upon the sod until you have filled up the wide part equal to the surface: and if the land is not intended to be ploughed, let the mould which covers the drain be properly pulverized, and sown with grass-seeds, which will make a tough sod. This I recommend as a good method: it will make the drain last for a considerable length of time, and be attended with little expence. If the sod is of such a crumbling nature as

to

to be apt to break to pieces, some small bits of elm or any other plank (though elm is certainly best) will keep the sod from falling in; and the grass-roots, when a little grown, will give it a compactness, and make the parts of the mould closely adhere. I have known land thus treated afterwards ploughed, and answer extremely well. This draining is generally called *shoulder-draining*. Thousands of acres in mountainous countries might be improved wonderfully by means of drains, which would answer the double purpose of taking off the redundant water, or of retaining and distributing it in dry seasons.

On the tops of mountains the vapours floating in the atmosphere are attracted, condensed by cold, and precipitate in rain, dew, &c. The minute particles of water, by their gravity, easily penetrate through beds of sand and light earth, till they are stopped in their descent by firmer or more dense strata, such as beds of clay, stone, &c. &c. and collected in the cavities and subterraneous caverns which nature has formed  
for

for reservoirs. The water thence issues out at the sides of the mountains; and by means of drains properly cut it may be conveyed in any direction, overflow the meadows if necessary, and, before the final discharge of the superabundant quantity, refresh and fertilize the valleys it passes through. I witnessed an instance of this in viewing an estate near Whitby upon the moors, where numbers of springs of most beautiful water trickle from nearly the summits of the hills into the valleys. Mr. Bakewell would always assert that the purest water improved land the most; but I must own he did not convince me that the assertion was absolutely true.

In valuing the estate just mentioned, an industrious old farmer attended me. I found the greatest part under very bad management: in several places many acres were rendered useless by the springs from the hills breaking out, and continually spreading over the land: the cattle going over the ground trod it so that it was like mortar, to the great detriment of the tenants,  
who



who complained heavily that their land was *springy* and *rushy*. I endeavoured to persuade them that a remedy was easily to be found, and pointed out the method above described ; but I had not the satisfaction of making one convert to my opinion. I do not believe one single man placed faith enough in me to risk putting my advice in practice. My old attendant indeed wished he had been a tenant upon the spot ; for on the farm where he resided he was continually thwarted in his attempts at improvement by the gentleman his landlord ; or rather by the gentleman's agent, who was a taylor by trade, and could not be supposed to know much of land, or the methods of managing it to the best advantage.

After I had gone over this estate, my old attendant requested me to view his farm. I complied ; and saw many valuable improvements he had made by under-draining with stone, to convey the water from the hills down to the currents below ; but the drains did not entirely meet with my approbation.

I had

I had said to some of the tenants, that it might be easily proved, " That land not then worth more than 6s. per acre, might be made by means of the very water they deemed a nuisance capable of feeding bullocks in a very little time ; and that water, if properly applied, would greatly enhance the value of the estate." The old farmer was a little staggered by this assertion of mine ; for most certainly he had considerably improved his farm by taking the water from it by under-draining, and by keeping sheep ; and he thought it must be wrong, to throw water upon the surface in any case where it could be conveyed away by under-drains. He took me to the summit of a hill, and shewed me a strong spring that used nearly to destroy part of a large meadow of his. To cure this, he had fixed seven stone troughs, each placed at the end of the other, for his cattle to drink from : and at the end of the troughs he had made an under-drain of stone, which reached half a mile. The current was so strong it would have turned an overshot mill. By means of these  
troughs

troughs the farmer obtained in the year many loads of dung, deposited by his cattle in the water when they went to drink. This dung would otherwise have been totally lost. He had made under-drains for all the rest of the field, which was a large one. I admired the improvement; and, recollecting Mr. Bakewell's maxim, "that pure water was the best to improve land," I examined whether this apparently clear water had left any sediment. The lowermost trough, being the last of the seven, was nearly full of the finest, richest wharf. I ever saw: it was most like the soft pulpy matter contained in a crab's shell. I took some in my hand, and found it as fine as the ground white lead used for paint. We then got over a wall into a pasture, where my old friend shewed me a valuable land he had made by under-draining in the manner before mentioned. He observed to me, that the upper part generally yielded as much hay as could be drove out with a scythe; and that when the water was first drained from the land, there was little else

besides nettles and docks. This was at top, where most of the sediment had lodged. I was convinced that wonderful use might be made of the springs on the hills, by making a main drain near the summits, to form one or more reservoirs. Such water would improve the whole farm, and be conveyed so as to refresh any of the pastures or meadows at such times, and in such quantities, as the farmer should approve of. He might always have water at command by under-drains, and a reservoir. A very small sluice at the top of the under-drains would shut and open, to let the water run, or stop it. A little lower down, by way of fence, another reservoir might be formed, and by such means improve the whole estate. In short, I never saw any estate so easily to be improved, or so much to be increased in value by a trifling expence. But there are thousands of acres in the same situation.

In Craven, as well as the North Riding of Yorkshire, and in Lancashire, many estates may be improved in the same way. I have not yet seen this method practised there;

there ; though so many thousands of acres are nearly spoiled by water.

With respect to the method of making under-drains, I must add, that where neither swarths nor stones are to be had, osiers laid in them green are good substitutes, and will last an almost incredible time, if kept covered from the external air. I have seen osiers taken up some years after they had been deposited in the ground, and the bark was as fresh as if they had been just cut. I repented I did not set one, to try whether it would grow. Almost any thing put in green will serve the purpose of covering drains. Even straw has been used with success : but I dislike that method. In fact, I disapprove of every thing that prevents straw from being made into manure for the benefit of the farm. It ought always to be returned to the farm, and every grateful farmer will do so.

Under-drains are made in an excellent manner with brick-work : but that method has become too expensive since the high duty laid on bricks ; except perhaps in the



vicinity of large towns, where land bears an extravagant price; or in pleasure grounds, where money is not laid out with a view to profit. Drains of all sorts must, as before hinted, be cut in proportion to the quantity of water they are meant to take off.

Wet sand is the most difficult to drain by open or surface-draining of any land whatever; as the sand is continually running in and choking the drain. There is no way to manage it, but by under-drains: and then the sides must be supported by something solid, such as stone, brick, plank, &c. Bricks or tiles made with holes in them, like those put on the ridge of a house, are the most proper in wet sandy soils.

## SECTION LII.

*Opinion on Lime: what Land it is proper to be laid on: the good and evil Consequences attending its Use.*

BY laying plenty of lime on a moor soil, it has been found by experience to form an artificial clay. This has been proved on a large tract in the Yorkshire levels, to the great profit of those who have made the experiment; for there are scarce any lands in the kingdom which yield more abundant crops at such small expence. When once this kind of earth gets by means of lime into a solid state, the manure afterwards made upon the land by proper application nourishes and improves it; and, like a sum of money once accumulated, produces a profitable interest.

It is an easy matter to prove the advantage of laying clay in preference to lime on light sand. By dressing half a rood of such land

with clay and manure, and another half rood of the same field with lime and manure, you will find a great difference in the crop. *Clay* will enrich a sandy soil; as *sand* in like manner will ameliorate a *stiff clay*: by being blended together, the rigidity of the clay is overcome, and the mass is rendered fertile. In some lands where the strata of earth are thin (as in Nottingham forest) I have observed a light body of sand covering a bed of clay. By ploughing sufficiently deep, the two bodies are intimately mixed and connected, and form a most excellent soil with little labour.

I do not mean to say, that lime may not be used to advantage where the soil is very sandy, or mixed with gravel. But on a loam or clay, lime is often pernicious in some degree, as it will bind the soil like a rock, and effectually prevent vegetation. For plastering walls, the workmen use for the first and most solid coat a mixture of lime and loam. A spoonful of lime made of the gypsum so common in Derbyshire and Lincolnshire will convert half a pint of  
water

water to a solid mass; which is surely proof enough of the binding quality it is possessed of. In short, what is the hardest mortar, that will endure for ages, but a composition of lime and sand tempered with water?

No one ever supposed lime capable of affording nutriment towards the support of vegetation. I had a strong proof of the ill effects of a profusion of it. I entered into a sward close, which had been in grass nine years. One corner of the close was overrun with couch-grass. I ploughed the whole field up, and sowed it with oats: but not an oat grew upon the part where the couch had been. Next year the field was sown with peas: not a single pea grew upon that spot! I had observed that a heap of lime had been deposited in the corner now spoken of: but it did not strike me that lime was so great an enemy to vegetation. After the peas were off, the field was ploughed three times for a crop of wheat; and I set a man with a fork carefully to pick out every bit of twitch from the corner, and bestowed something more of manure upon

it than upon any other part of the field. The rest of the field yielded a most abundant crop: but still upon the unfortunate spot I could not get a single grain! Next year it was sown with oats: not a grain on it! although the other part of the field was covered regularly six feet high, and so remarkably thick that no animal had offered to make a track through it. Next wheat, again fallowed and manured. An excellent crop, which I sold for ten guineas per acre, exclusive of the expences of harvesting, thrashing, &c. I was allowed to retain the straw and chaff for my own use: yet, notwithstanding all the pains taken, not a single grain grew on the spot in the corner. From the above experiment I infer, that, had the whole field been limed equally with the spot I have mentioned, it would have all been equally barren.

I know a piece of rich land (which at this time lets at 3/. 10s. per acre) ploughed out of old sward which had not been taken up before in the memory of man: it was sown with oats, next *limed*, and immediately  
after



after liming, sown with *turnips*. As this land was so rich and fresh, I was sanguine in my hope of a luxuriant and speedy crop; but, the plants not thriving according to my expectation, a kind of anxious curiosity was excited in my mind that occasioned me almost daily to examine them minutely. I observed them to grow as they would have done upon a poor *lime-stone soil*: they were nipped up, with the leaves round and short. But, although the lime appeared to have shut the door on vegetation, yet, the season being remarkably mild, and wet, and of course favourable to turnips, the plants grew strong, and, from the great fertility of the soil, a good crop was produced; but the lime stopped their progress for some time.

But were the lime laid in winter on land when sown with wheat; by lying upon the top it would prevent the frost from penetrating to the roots of the wheat, hinder the growth of weeds, and become in a proper state to be intimately mixed with the soil for turnips. I am of opinion, almost any kind of earth or lime laid on as above

in

in winter will add a freshness, or rather coolness, so as to make the young tender turnip-plant continue its growth. But you must take care not to lay on too large a quantity upon some soils.

Another mischievous effect of lime I experienced on the farm at Claythorpe, belonging to Mr. Vyner. I had ploughed up a rich piece of pasture, and got a crop of oats, turnips, barley, and wheat. As Mr. Vyner had plenty of stone-lime in the next parish, I was induced to fetch some, and lay it cross the land intended for wheat, in two directions: but, as long as I remained upon the farm, every crop was lighter upon the two parts limed than upon any other.

From the above experiments this inference may fairly be drawn respecting the use of lime: that it is chiefly favourable to a light sand, or mixed gravel, and to peat earth, moor, &c.

SECTION

## SECTION LIII.

*On Composts. Opinion on the different Sorts.*

THE best composts are those which are made of several sorts of soil, or earthy matter well blended or worked together, and mixed with manure, to mend and improve impoverished or worn-out lands, and to assist them in the task of vegetation.

Composts are of several kinds, and they should differ according to the different nature or quality of the soils which they are designed to meliorate, and according as the land is either light, sandy, loose, heavy, clayey, or cloddy. A light loose land requires a heavy compost, as clay, the scouring of ditches, ponds, drains, &c. On the contrary, a land that is heavy, clayey, or cloddy, requires a compost of a more sprightly and fiery nature, that will insinuate itself into and penetrate the lumpish clods, which, if they are not thus managed and broken, would

would very much impede the work of vegetation.

I will now give an opinion of the different composts most generally in use: but it is necessary to observe once for all, that great care should be taken that the different materials of which the composts are made be well mixed or worked up together; that there be not too great a quantity of any one sort to overpower and counteract the other; but that the whole be blended into one mass in a due proportion.

The best composts are those which ferment the quickest, and are generally mixed with manure. Though we call all dressing by the name of manure, we know there are various kinds, the choice of which for particular lands and purposes shews the skill of the husbandman. Bones, dung, chalk, lime, marl, clay, sand, bark, weeds, ashes, rotten-wood, saw-dust, shells, kelp or sea-weed, woollen rags, and an infinite number of other things, are excellent manure when used with judgment; but will prove as detrimental to one sort of soil as they may be beneficial

beneficial when properly applied to another.

Bones are good ingredients in composts. They are frequently made up with coal-ashes, or more properly cinders, which in my opinion is highly improper. Bones are naturally dry, except when broken very green, soon after the death of the animal they made a part of; in which case the moisture of the marrow is left to cause a fermentation for a short time: but those which have undergone a long boiling to extract every particle of oil, differ considerably in richness from the green and juicy. Therefore, instead of adding so powerful a drier as coal-ashes or cinders, which must counteract the effect intended, something moist should be applied to form a compost and promote fermentation. I am of opinion, that, were bone-manure thrown into the reservoir in the fold-yard, and well mixed with earth, stubble, or any such refuse, the bones would absorb the rich juices, and recover the virtue they had been deprived of by boiling. This method seems more



more rational to me, than forming a compost of dry bones, dry ashes or cinders, poor rammel, or dead earth, such as is generally used for the purpose. For, of all the composts I have yet tried, I have invariably found that the more hearty the materials used, the better has been the compost, the greater the benefit the land has received, and of course the more abundant the crop. Besides, the above treatment would prevent the dogs, crows, &c. from carrying the bones off the land.

I have tried the effects of a compost tempered with bone-manure on different soils, and found it prosper best on a moist soil. I laid some compost of this kind on a piece of land that had been ploughed and sown with corn for some years, and which I had never known produce the seed again. This piece was a pan, or hollow, in the middle of a ploughed field, which had never been drained. I followed my predecessor's method for three years, did exactly like him, ploughed, sowed, &c.—but reaped nothing! Tired of this fruitless expence, I set about  
draining

draining the field, and manured the whole with bone-compost ; and the spot which until then had been so very unprofitable bore a better crop than any other. One part of the field lay high and dry, and always used to bear the best crop, but the bone-compost had no great effect on this dry part ; for it was by far the least productive according to its quality. The bones were mixed, according to the usual method, with coal-ashes, and spread equally over the whole field—a convincing proof that compost so made is not proper for dry land.

I last year had a quantity of bones broken and mixed with good earth, and laid it on a piece of moist land. A very good crop ensued. I made some experiments two years since on a piece of grass-land, with a compost made of bones and coal-ashes without any other mixture whatever. This was thrown on at the rate of sixty bushels per acre. On another part of the same close nothing but coal-ashes were strewed ; on another, manure or wharf out of a pond ; and on another, some stuff collected  
from

from a fold-yard, pig-fold, &c. From the above different dressings there appeared great difference: the coal-ashes were by far the best; the stuff from the fold-yard, pig-fold, &c. was the second best; the bones and ashes were third; and the wharp from the pond, the worst of all. The above manures were all of them of little service the first year: but the second year they produced a very great crop, the best and longest natural grass I ever saw. The bents were continued heads four feet high, and the under-grass was at least three feet, but not quite so thick set at bottom as I expected. The dressing having been laid on thick, and a very great flood coming soon after, the crop was rather thin the first year. The ashes this third year still keep the lead, as does the stuff from the fold-yard the second place. Last year the eddish was short all over the field, owing to the grass standing too long before it was cut, as the season had proved so rainy. Letting grass stand over long without mowing is certain to impoverish the ensuing eddish.

I saw an experiment tried on a meadow. Every other land had been manured with horse-dung compost, and with bone-compost, alternately : this had been done six years. The meadow was regularly mown every year : the eddish was on the land when I saw it ; and where the bone-compost had been laid, the crop had been, for the last two years, by far the most abundant, and the after-grass was most luxuriant. The soil is a poor cold clay : and for such soil bones are the most nourishing of any thing, except coal-ashes.

My own land, on which I tried the experiments before mentioned, was a poor wharp, and was in some parts wet and poachy, and in others very dry : the compost was laid across the land, which was ridge and furrow. The manure taken out of the pond was found to answer best upon the ridges—an additional proof of that kind of dressing not being proper for wet cold soils. But it will suit gravel, sand, or any light dry soil.—All the bones I made use of were horse-bones, not boiled, but

fresh, and of course abounding with oil, which caused a strong fermentation. I laid per acre seventy bushels of these bones mixed to a compost of four cart-loads per acre.

Every family should have a particular place set apart to receive bones, as it is a pity to waste such good and profitable manure. Every bone which goes from the table should be collected in such receptacle : fish-bones most particularly ; for I am of opinion they are preferable to any. Bones are sold at various prices in different places. For the purpose of breaking them, the power of the threshing-machine, heretofore mentioned, might be applied to turn two rollers with teeth.—If no horse-machine can be procured, it is very easy to erect an engine something similar to that used for driving piles for the foundations of bridges, buildings, &c. which may be worked by men ; or it may be contrived, by means of a roller or windlass turned by a winch, to be worked by a single man ; the rope being threaded through a pair of blocks or pulleys,  
and



and the rammer discharging itself when at a proper height. There is scarce any millwright but knows how to erect such machines at a small expence, without my giving a description of what is very common. But if you are in want of means to employ your men in bad weather, there is a more simple method still, by fastening blocks or pulleys to a strong beam, and by main force drawing up a heavy weight, which you suddenly let fall upon the bones to crush them. This would be pretty play, as diverting as bell-ringing ; and it requires no science in the performers. Six-pence per bushel is given to the breaker : the poor people might do it by a hammer.

Fish-blubber is another very good material for a compost. It should be mixed up with good earth, and put in the middle, in the same manner as you put an apple and encrust it with dough to make a dumpling. When the blubber has done heating, turn it over upon good earth, cover it in the same manner as before ; and let it lie in that state until near the time it is wanted. The

compost should then be turned over again, as it cannot be too well mixed and blended together. Some use refuse of soap-boilers : but I am not very fond of composts so made, and give the preference to the two above mentioned.

Soot, pigeons-dung, and rape-dust are all hand-manures ; but are better made into composts and applied in drill husbandry (as recommended in this Work) than used singly.

I had last summer the finest garden-cabbages and early peas any where to be found, all growing by compost made in the most simple manner. The cabbages were universally allowed the best and forwardest of any that had been seen that season in the Doncaster gardens, which are by far superior in respect to soil. This I attributed to management ; for the natural goodness of some of those garden soils certainly equals the compost I used in my drills.

My compost was made from the shovelings-up of the fold-yard. I had the manure carried out when the weather was dry ;  
and,

and, when rain came on, I set the men to coul and shovel every part of the bottom of the fold, and likewise every part where I thought any thing useful might be found. Amongst other things, there might be one cart-load of human excrement from the necessary. I had a feeding pasture, which in one corner produced nothing but nettles, docks, and other useless weeds: the compost was piled up in a heap on that spot. I ordered the men to dig round, and sod it about twelve inches thick round the sides and top, so as to inclose the inside materials with a perfect crust. The manure thus inclosed, being moist and rich, fermented very much for about fourteen days. When I perceived that the fermentation was checked, and the heap grew cool, I ordered it to be removed to a place where I had prepared about ten loads of manure made by pigs, horses, &c. during the time the first heap had been fermenting. The last-mentioned manure had been made by horses and cows from green fodder and wheat-straw chopped, as before recommended, and by pigs

in the fold where the manure was laid. There had been some couch-grass roots laid for about three years with some soil in them of a poor nature: these amounted to several loads, and we incrufted the fresh manure with the first-mentioned compost, in the same manner as described in the first instance, or, as I said above, like an apple in a dumpling. Some rain fell shortly after, which caused a second fermentation, and a very strong one. I suffered it to ferment until scarce any smoke or vapour could be perceived to arise. I then ordered it to be turned over, and mixed the couch-grass roots and all together. I found the hill of compost very rich: if I had not known there had been such a quantity of earth in the composition, I should never have given credit to any one who had asserted the compost to have been made with so small a quantity of what is termed manure.

I had fixed my plan for setting the cabbage-plants, and intended this compost only for them, and for one acre of forward peas. As I knew my quantity of manure did

did not exceed twenty loads at first ; that the last ten loads added, if fairly rotted down, could not be estimated at more than five loads ; and that the first manure, by being shoveled, must have accumulated some small portion of earth ; I was surprised, when the hill was turned over, to find near four-score cart-loads of compost by measurement—a proportion of upwards of three loads of soil to one of manure. I began to fear I had been too liberal of earth, and too sparing of manure, and that my cabbages would suffer for it. The land I intended to plant them upon being poor soil, and having had a crop of potatoes, a crop off wheat, and then a crop of oats, I was very certain that without assistance it would not bring a cabbage to perfection, especially in winter. Therefore I knew all must depend upon the compost.

As soon as the oats were mown, I had them moved from the land, and half an acre ploughed two days after. The half acre was then harrowed, and the rubbish raked off: it was then ploughed a second time,



harrowed and raked, and the rubbish carried off. Drills were made for eight rows. I then put in the compost, and covered it up with soil. In each drill I set four hundred plants. The weather being very dry, I did not much like my prospect; as I thought the compost would lose its virtue. At this time, my plants in the seed-bed being forward, they wanted thinning very much, and every thing appeared to be going wrong. In a week after, however, there was a fall of rain; the cabbages set, took root and grew surprisingly well: but to my great mortification oats came up thicker by four to one than ever they were sown. And what was still more astonishing, the oats which then made their appearance were Tartarian oats, a sort which do not shell half so much as some other kinds. I could not, when my oats were mown, perceive the smallest loss, nor were they over-ripe. This circumstance made me ruminate upon the great loss there must be sustained when oats appear, as is frequently the case, thicker on the land after cutting than when they

first come up after sowing. When we sow oats, the land is seldom sufficiently pulverized to receive the seed in a proper manner: consequently, there must be more sown than necessary if it were deposited as it ought to be, so that every seed that is sown should vegetate. This land having been sown, when in wheat, with rye-grass, was ten times thicker with rye-grass than with oats: on the whole, that part was a complete sward. This land having such numbers of different plants to feed, I feared my cabbages would thrive but poorly: but they did not receive the least injury. The land was hoed as soon as the cabbages would admit.

Through the whole of this Work I have repeatedly endeavoured to convince the farmer, that with proper management he need not be under the necessity of buying manure; for every farm will raise fully sufficient of itself. As an additional proof, I will now enumerate the different crops raised by the assistance of the twenty loads of dung before mentioned, and will likewise set

set down the number of acres. The reader will recollect that the twenty loads of dung were manufactured, including the addition of the horse, cow, and pig dung (which I estimate when rotten at five loads), into eighty loads of compost.

|                                 |          |
|---------------------------------|----------|
| First, half an acre of cabbages | 16 loads |
| Second, half ditto ditto        | 12       |
| Third, half ditto ditto         | 8        |
|                                 | <hr/>    |
|                                 | 36 loads |

Finding so much of the compost left on hand, and being also in possession of more manure than could possibly be wanting for my rotation of other crops, I determined to try a new experiment on six acres, which were intended for oats the next season, and which had that year produced wheat. I cleared the wheat stubble, and made a complete fallow of the six acres. I laid on them thirty-six loads of my compost, and sowed them again with wheat; for I always was of opinion that land would bear good crops

crops of wheat for successive years, if well manured, and kept clean of weeds and rubbish. A good crop was produced where this compost was laid. This sort of cropping, however, I much disapprove of, except for experiment's sake. One acre of early peas had of this compost six loads ; and one half acre of pearl peas three loads. The account will then stand as follows :

|                              |    |
|------------------------------|----|
| Loads of compost to cabbages | 36 |
| Ditto of ditto to wheat      | 36 |
| Ditto of ditto to peas       | 9  |

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Total loads 81

So that there was a difference of only one load between my estimate by admeasurement, and the loads actually carted of it for use upon nine acres of land. Upon three of these acres, so drilled and managed, there was a most abundant crop. I do believe, that in the whole kingdom there were not to be found on the same quantity of land so great a number of cabbages equal in weight,

weight, and so soon ready to cut; nor of peas that yielded such great measure, and that came to perfection so early. This fertility is greatly to be attributed to the use of my compost, and is sufficient, one would imagine, to stimulate the intelligent and enterprising farmer to follow my method in collecting materials for making a compost so simple and valuable, and not to suffer in future (as now is the case) the manure to lie until by exhalation it is deprived of the finest parts, and drained of the best juices, to the loss of more than half the value.

It may be objected by some who are bigoted to old customs, and enemies to all improvements, "that every man has not a soil rich enough to mix with manure in order to form the compost above mentioned." Such a case can seldom happen: but we will suppose it. The farmer then, who has no other than very poor soil, should let the bottom of the fold-yard be covered with it, so that the juices of all the dung and muck may  
 drain



drain into the mould: and he will find, when he comes to work this same mould up in the manner before described, that he will have a good compost, and in as great plenty as the farm may require.

I am of opinion that, where the land is designed for turnips, six loads of such compost put in the drills as before mentioned, would produce as good a crop as double that quantity of dung made use of according to the old method.

My gardener dug up some narrow grass-plats, wheeled them on a heap, and mixed a small part of manure with them for the use of the garden. I observed there was at least four times as much of the sward as of the dung. I took particular notice of his crops the next season, and found them better and more regular than when he used manure alone.

The frequent turning of manure prevents the effect intended; as it destroys fermentation. Manure ought never to be turned, except for the purpose of mixing it with  
other

other ingredients to form a compost. The incrusting strong manure in the manner before directed, with a layer of mould at the bottom, by way of under-crust, to receive the moisture that must inevitably drain from it, is the best method I know of to prevent unnecessary exhalation, to increase fermentation, and to render a compost speedily fit for use.

I have made repeated trials of lime in several composts, but I never found it add to the burthen of the produce. On the contrary, I have the strongest reasons to suppose that lime has been the occasion of considerable failures, where from every circumstance the crop might have been expected to turn out abundant. As composts are to supply the place of manure, lime should not be added in great quantities as an ingredient; for lime is of a binding nature, and adds weight to light soils. But in the drill-husbandry, composts made as here directed will be found much preferable. By putting the compost in a drill six inches wide at the top, and perhaps four inches at the bottom, and  
allowing

allowing thirty-two loads to one acre, the compost being folded up in the manner described, the plants, though standing in a poor field, have a rich soil to feed on and grow in, like a fat horse in a poor pasture, but plentifully fed with corn.

The different things used in agriculture under the general name of *manure*, differ essentially in their nature, and almost as much as to the proper time for using them. For instance: if, to make bone-manure, the bones of a horse be ground within one month after his death, and then the bones of another which has been dead *twelve years*—(this I have known to be the case) can any one suppose the old dry bones capable of rendering the same service as those which are green, and consequently replete with oil? Or can bones which have been boiled for the express purpose of extracting all the oil be equally useful with those which abound in juices? May not this difference in respect to the state of the bones be often the cause of the difference in opinion concerning their use? One farmer will ex-  
tol

tol the use of bones, another will depreciate them so far as to say they are good for nothing. This comparison will hold good in respect to the compost I have recommended. The manure must be full of sap and juices, and of a strong quality, and worked up in a proper time, so as not to lose the virtue possessed; or it will be as ineffectual as dry bones broken. Any man who understands brewing will comprehend what is meant by evaporation and exhalation, and will tell you that either may be carried so far as to discharge all humidity, and leave only a dry and almost useless lump behind.

Lime differs so much in quality, that I will not pretend to say it can never be mixed to advantage in any compost: but I can say that I never found it answer. There is one general rule, however, that I recommend to the farmer: If he can by attention and art procure manure upon his own farm, not to spend both his money and time in seeking it far from home. If the value of straw, when eaten by cattle, and the dung made into compost, were considered, it would

would be nearly as dear as hay. He who sells the whole of the produce from his farm, is as foolish as the boy in the fable who killed his goose to get the golden eggs at once. *Great goings-out must have great comings-in.* This is an old adage, well understood: and if the farmer does not replenish with manure, he will soon find his land decrease in produce.

#### S E C T I O N   L I V .

*Opinion on Water-Meadows, founded on Experiments. Nourishing Manure left by the Sediment.*

IMPROVING, by means of water, such land as by nature is formed to receive that benefit, is a good and cheap method. But, when land lies a little above the level of the water, or, being of an uneven surface, part hillocks, part holes, must be levelled by the spade, or even by the plough, it will frequently be found not only expensive but



detrimental. For, in levelling, the hillocks are robbed of the best soil, a superfluity of which is thrown in to fill the holes ; and it must require a considerable length of time before the water can deposit a sufficient quantity of sediment to be distributed equally, and of a proper thickness, over all the land, so as to afford nutriment to useful plants upon those spots which from their elevation had been left barren. I think the method I mentioned before, under the head Surface and Under-Draining, Section LI. p. 13, much more likely to answer the purpose, provided you have a spring or reservoir on a neighbouring hill. By means of drains properly managed, you may convey water when and where you will. Some meadows are more susceptible of improvement by these means than by any other : and your compost may be used to more advantage elsewhere than on them ; for, if they are liable to be overflowed, the manure is frequently carried away and lost ; or a very heavy rain, by coming down in torrents from the hills, may occasion the same mischief. Regularly

ly and gently watering by means of drains has none of the above inconveniences, as what sediment is left clings to the roots of the grass like glue, and cannot be easily removed. It does not require a great weight of water to nourish meadows, but a constant and easy succession.

The first water-meadow I saw was at Dishley, at the late Mr. Bakewell's. The operation was performed on a very poor piece of land, which had been nearly overgrown with rushes. Mr. Bakewell told me the rushes had been killed by the water: but I am apt to think their extermination should be attributed to the frequent cutting them, and letting in the water; for, being so full of pith, they would contain a great quantity of water; and, the frost coming upon them in that condition, they must inevitably perish. To cut rushes is one means of destroying them, if done late in the season, so as to leave the pith open in the winter. Cattle were feeding, in the summer, on the grass of this water-meadow, to the great profit of the owner. They were very fat, and

were the first I had ever seen stall-fed in summer.

All land intended to be converted into water-meadow should be particularly well under-drained before any water is let on it; as the under-drains will be of infinite use, acting like a strainer, by drawing the superfluous water from the surface, and leaving the sediment behind. This, surface or top-drains would not do effectually.

When I returned from Dishley, I tried this improvement upon some land of my own; but found that the quantity of water I was master of was insufficient, and that it was better applied in the fold-yard, where it was received in a reservoir for the purpose of forming a compost, as already mentioned.

Upon the whole, artificial watering of meadows is a most excellent improvement: it robs no dunghill, but raises one for the benefit of other lands. For, if a farmer can water ten acres of land, cut the grass and use it either in stall or fold-feeding, he might keep perhaps forty beasts; and, by working

the manure made by them into a compost, and applying that compost to other lands, he might either have a great deal more hay for the winter, or feed more cattle in the summer.

## SECTION LV.

*On Pigeons, and the best Method of treating them.*

DOVECOTS ought to be built so spacious that the pigeons may with ease and comfort to themselves fly about within them, and that, if any thing alarm them from without, they may readily escape. If a dovecot be high, and narrow within, pigeons will dislike going to the bottom: I have known, when young pigeons have tumbled out of the nest, that the old ones have suffered them to starve rather than go to the bottom to feed them. I had a summer-house in my garden, which I converted into a dovecot. For sake of ornament, I raised

my new building a considerable height: but the inside was narrow like a well. The young pigeons frequently fell on the floor, some of which were found dead with empty craws, others picked up alive, but half starved. No pigeons ever laid their eggs in the bottom holes; nor would even the young roost in them. We had a great number in the winter, because we fed them well; but many flew away in summer. I put in a floor about half way down, and they prospered much better.

A man, who besides exercising other trades went about the country to kill rats, and had been employed in that capacity by an uncle of mine, was engaged by a neighbouring gentleman to repair some nests in his dovecot—the largest and best I ever saw. Having a strong inclination to build a cot and raise a stock of pigeons, and hearing of this famous dovecot, I went with the rat-catcher to view it. The nests were all made of small wickers, like basket-work. Though this was quite a new method to me, I could very easily conceive it was the best I had seen:

the



the pigeon in a wild state makes her nest so; and he will not err much who observes and takes nature for his guide. However, as this method was expensive, I varied from the plan, and made mine of clay and laths. I did not inclose it in front, because I then thought (what I am now convinced is true) that pigeons like to be more at liberty than the common form of dovecots allows. The one I examined was in the middle of a town, and in the centre of the most populous street. I was amazed the number of people almost continually near the place did not disturb the pigeons so much as to make them forsake their habitation, especially as a blacksmith's shop was situated close to it: but my guide, the rat-catcher, told me that pigeons delighted in noise and company, and that, if they left the cot, he knew how to fetch them back again. I thought he dealt a little too much in the wonderful. He advised me not to stock the dovecot until the latter end of the year with the harvest flight; as pigeons bred at that time are the stoutest for the winter. I followed his

advice, and in the proper season colonised it with four dozen of pigeons, and kept them inclosed for some time; but when they were let out, they all flew away in a few days. One or two would sometimes come about the cot, but I despaired of ever making them fond enough of their habitation to breed in it.

Recollecting however the assertion of the pigeon-conjurer, I sent for him, and he paid me a visit the next day. He began by filling a large pot with water, and immediately threw some ingredients which he took from his pocket into the water; set the whole on the fire to boil, and kept stirring the ingredients about until they were entirely dissolved. He went with this mixture into the dove-cot, and took great pains to lay it on with a painter's brush both in and outside the holes. He then got a ladder, and in the same manner washed over the loover, or aperture where the pigeons enter, with the same mixture. In spite of the assurances given me by the operator that my pigeons would return, and perhaps with additional

additional company, I did not place implicit faith in his predictions, and could not avoid expressing some doubts of the attracting power of his nostrum. But he consented to stop until the next day, when the pigeons were to make their appearance ; upon the terms, " No pigeons, no pay." About eleven o'clock a single pigeon came, and about three the same day all my emigrants returned. My stock soon grew numerous, and they never after forsook the cot. A most extraordinary good one it soon proved, with the assistance of a colony of strangers, who had been enticed to take up their residence by the fascinating accommodations provided by my rat-catcher.

I could not prevail upon the man to disclose his secret, or I would here give the recipe for the public good : but the principal ingredients were undoubtedly salt and asa-fœtida. However, as he had convinced me of his skill in pigeons, I listened carefully to his instructions concerning the management of them. He advised me never to go into a dovecot later than mid-day,

day, but as early in a morning as convenient. Whatever repairs are necessary, either to the building or to the nests, should be done before noon : for, if you disturb the pigeons in the afternoon, they will not rest contentedly the whole night ; and the greatest part perhaps will not enter the cot until the next day, but will sit moping on the ground ; and if in breeding-time, either a number of eggs may be spoiled, or several young ones starved to death. He likewise cautioned me against letting the first flight fly to increase my stock, but to take every one of them ; as these will come in what is called *Benting-time*, that is, between seed-time and harvest. It is then that pigeons are the scarcest ; and many of the young would pine to death through weakness during that season.

It is necessary to give food to pigeons during the *Benting-season* only : but it should be done by three or four o'clock in the morning ; for they rise early. If you serve them much later, they will keep hovering about home, and be prevented taking  
their

their necessary exercise. If you feed them the year round, they will not breed near so well as if forced to seek their own food; for they pick up in the fields what is pleasant and healthy to them, and from the beginning of harvest to the end of seed-time they find plenty.

At the latter end of every flight be careful to destroy all those eggs which were not laid in proper time. The proper time for the spring-flight is in April and May. After the harvest flight, cold weather begins to come on, which injures the old pigeon much if she sits late; and the young will be good for nothing, if hatched. A warm situation suits pigeons the best.

It is very necessary to pay attention to cleanliness in the management of a dovecot. Before breeding-time the holes ought to be carefully examined and cleaned; for if any of the young die in the holes in summer, maggots are soon bred in them: they become putrid, and emit a disagreeable and unwholesome stench, very injurious to the inhabitants of the dovecot. Pigeons  
are



are tenacious of their nests, as appears from the conduct of the wood-pigeon, which will breed for years in the same tree, and the mother forsakes hers with regret: but, unable to endure the filth and stench of her dead offspring, she is obliged to quit the eggs she has laid for a second brood; and the prime of the season is lost. Every summer, immediately after the first flight, the nests should be all cleaned out, and the dung totally taken away, as it breeds filth. But remember to do this business early in the morning. You ought likewise to destroy the remaining eggs, and make a perfectly clean habitation for the harvest-flight.

Pigeons are profitable and useful. Although they be supposed to do much mischief in seed-time and harvest, I contend that the farmer is a gainer by them, and repeat my assertion that they are both profitable and useful. They make an extraordinarily good manure, which, if worked up into a compost, instead of being used in the present slovenly way, would be of still more value.

value. Pigeons, like many other animals, are more productive from the breeds being crossed. I put a few tame pigeons into a dovecot; and the consequence was, that I had a more early and a more numerous hatch of young than any of my neighbours.

In general, a dovecot has treble the number of holes that are used. I took off the roof from one of mine, and put a new one on without doing any injury to my pigeons: but I did not suffer the workmen to work after twelve o'clock at noon. It was a very low cot, but wide, with few holes in it. I have had six dozen of pigeons in a morning from it. Many of them bred on the floor: an old table stood in the middle of the cot, and several had made nests and bred upon it; which makes me think it not necessary to inclose the holes in the manner so generally practised.

It is erroneous to suppose starlings destroy pigeons' eggs, or injure a dovecot: they only take up room. Pigeons have a great antipathy to owls, which find their way

way sometimes into dovecots ; and there is no getting rid of so troublesome a guest but by destroying him. Rats are terrible enemies to pigeons, and will soon destroy a whole dovecot. Cats, weasels, and squirrels will do the same. It will be necessary, therefore, to examine the dovecot once every week at least very minutely.

## SECTION LVI.

*Description of the necessary Utensils in Husbandry for clearing Land, &c.*

IN the first Section I described the method of fallowing land, the use of the plough, harrows, drag, a roller and couch-rake. Having seen many different instruments employed for the purpose of clearing land, I find none so effectual as the plough and harrow : for a drag is nothing more than a harrow with a scarifier made by the teeth, having a kind of hoe at the bottom, so as to get under couch-grass, or  
any

any sort of weed, and so to pull them up instead of cutting them. This is an instrument proper only to be used after drill-crops, and in fallow-land; for, the land then lying in small ridges, and the manure all inclosed within them, the scarifier, by going across the ridges, pulverizes the mould, and mixes the manure much better than the plough is capable of doing, and performs the work with less expence. Indeed land ought not to be ploughed after drill-crops until cleaned, which must be done by the scarifier.

Mr. Cooke's implements for drill-husbandry are by far the most complete of any I have seen. But the cleaning of land depends full as much on the skill and integrity of the labourer, as on the choice of the implements proper for the business. Every thing may be expected from good tools in the hands of a *workman*; but in the hands of a *bungler* even the best of tools will produce but sorry work.

The expence of cleaning land is trifling in comparison with a good or bad crop: and,  
if

if land has a drill crop every other year; as before recommended, a number of utensils will not be found necessary; ploughs, harrows, rollers, and a drag, will be sufficient.

A drag is usually made about seven feet wide behind, and of a triangular form; with about 13 teeth in each of the sides, placed in such a manner as to cross each other, and fastened in with screws at top. If you wish to make your drag into a scarifier, the teeth should be wedged in like a coulter, as you must have a different set for scarifying.

Mr. Cooke's scarifier, or horse-hoe with teeth, is intended to scarify between the rows of drilled corn. To me, however, it appears of very little use, except to lighten the soil; as I can find nothing equal to a plough, for the purpose of cleaning land, and earthing the crop. The greatest part of my drills are at least two feet asunder, and consequently wide enough to admit of a plough going between the rows. If the rows were nearer to one another, a smaller plough might be made to go between them.

I have tried double-moulded or double-breasted



breasted ploughs to earth up the rows : but they will not at all do in drill-husbandry, as you cannot humour them to the width of the rows, which are sometimes a little wider or narrower ; and if they vary but an inch or two, it destroys the effect intended, as the mould cannot be regularly raised, and the corn will be in some places high, in some low. A common plough will perform this work to perfection : the expence amounts to not more than one shilling per acre, and the service rendered the crop is worth a pound at least per acre, exclusive of the advantage of cleaning the land better than by any other means ; for when you see a weed, you may with a common plough go sufficiently deep, or give it what direction you please to take it up.

I have tried Cooke's scarifier, and one invented by myself, for cleaning stubble after harvest ; but never found it answer so well as the plough and harrows. I much approve of Mr. Duckett's method of drilling : Mr. Cooke's drill frequently delivers the corn thicker in one place than another.

Mr. Ducket's is of so simple a construction that it may be made out of a drag ; for it is only having a number of mortices to put the small shares in, (that is, double the number of holes ;) for I am of opinion that white corn of all kinds should be sown not less than six inches asunder. The thicker it grows upon good land, the better : there is nothing to be feared from smothering it, as the product is at the top. Crops of white corn are liable to break down and receive great damage by wind and rain : but the thicker the crop, the more likely it is to support itself, as it will be shorter in the straw, and a weak straw or stem may be upheld or supported by a neighbouring strong one. Good land will produce long straw and heavy ears ; and if the corn is sown thin, it must of course fall to the ground ; and should heavy rains come when the blade is green, the ear cannot arrive at perfection.

There can be no doubt that corn will thrive much better when regularly deposited at certain depths. Therefore, if coulter  
made

made of wood were put into the drag, to be used after the land is harrowed and pulverized, to mark out the distances and the depth you intend your corn to be deposited (the quantity is easily ascertained); it might then be sown by the broad-cast, and bush-harrowed-in.

This drag may be made into a scarifier, and drill likewise if required. There must be two wheels to run before it, and a pair of stilts behind for a man to steady it and strike the depth of the drill. This method, or the drill-roller, I intend using in future for sowing all white grain broad-cast. But the land must first be harrowed and drilled, as above directed. As to distance, every one must act according to circumstances, as no general rule can be observed in that respect. Poor land will not support so much grain as good land: therefore the quantity of seed-corn should be in proportion to the quality of the soil; and to make the distances nearly four inches every way is proper on most lands.

The Rotherham plough I prefer. As

to the weight of the harrows, and the length of the teeth, they must be proportioned to the nature of the soil. Light soil, or sandy land, requires much lighter harrows and longer teeth than strong clay. All harrows ought to have the teeth racked, or inclining forward ; by which means they cling to the land, and cut as well as harrow the weeds. Taken hold of by the harrow, the weeds rise upwards and come to the top : and the harrow does not rise at every obstruction, but will do more service in less time. When your harrow is made, you must observe that the teeth all incline one way.

A drag with teeth fixed by wedges instead of screws, to take out and put in readily, and set to any depth you like, is a very useful instrument of husbandry. Where women and children are not to be had to rake up the weeds with a hand-rake (an instrument I am very fond of), a twitch-rake will be useful. It is generally made with two heads about seven feet long, having in each head two rows of teeth seven inches long, twenty-four in the hinder,  
and

and seventeen in the fore-head. The heads are placed about eighteen inches asunder, and are in substance about two inches square; but if made round, they will be better. There are a pair of shafts for the horse to draw by, and a pair of stils by which the man who follows may direct it. The drag is seven feet; the hind bull has seven teeth twelve inches long; the next bull is six feet two inches long, with six teeth twelve inches long. The teeth are made round, with a small turn at the bottom, and shaped like a bit of a hoe, to prevent the weeds from slipping at bottom, and to cause them to rise to the top of the land. The two bounds are coupled together by two pieces of wood bolted upon them two feet four inches asunder; and if designed to be changed into a drill, the two cross-bars must be long enough to put a pair of shafts on for a horse to draw and steady it, and a pair of stils behind for a man to strike the depth of the drills.

I have made trial of numbers of horse-hoes and hand-hoes of different kinds to drill crops: but they never thoroughly an-



swered my purpose. My land was left foul; my crops were scanty; and I was vexed and ashamed of having squandered so much money on the drill-scheme, until I luckily hit upon the method of using the plough, as here directed, and of putting the manure into the drills, &c.

The scarifier must be made so as to cut the roots of couch-grass at bottom as deep as the plough goes, that they may be drawn by the harrows out at full length without breaking. Such scarifiers are very proper for thistles, bracken, or wild oats, or almost any thing but twitch. They must be kept sharp, or they will rise out of the ground on the least obstruction.

Weeds which strike with a tap-root are not easily cut by a blunt scarifier, which frequently trails them down and leaves them growing. I have an invention for such purpose superior to the plough or scarifier. It is made of a triangular form, with a beam, and two small wheels under the beam, to run before it in the same manner as in the Norfolk plough. There are three coulter with a share riveted under

each of them, made at the point, like a fleam, sharp, and about fourteen inches wide. The coulter penetrate under the mould as deep as the plough, and, without moving the earth much, cut up thistles, brackens, &c. better than any instrument I have yet met with. Where such weeds are very numerous, I use a beam with one wheel, into which I put one of the coulters, to cut between the rows of the drills: it will penetrate any depth that can be required. The one with three shares will with a pair of horses do as much work in one day as three ploughs. It is to be observed, this machine will work only upon light land, when the fallow is well broken, and nearly clean of twitch. The frame of the drag, by changing the teeth, will do all those things. Where kitlocks grow, this machine will be found very useful; and it is of such a simple construction that any person may make one.

In respect to ploughs, almost every country has its favourite sorts, though each designed to answer the same purpose; but  
 G 4 the

the plough which costs the least money, is the lightest to trail, and makes the best work, is of most value. In Hertfordshire they use a very simple plough, which does her work well.

The teeth of all harrows ought to be put in with nuts and screws to fasten them in the bound, so that when they want sharpening they may be taken out and replaced without injuring it.

The coulter for the drill, if made of wood, should be of a triangular form at the part which goes into the land. To make the drills to deposit the corn in, the width must be such as will leave a proper space for the corn to fall in: this depends much upon the quality of the soil, and the depth the corn is intended to be deposited. Coulters made of iron are best, as wood is apt to clog and impede the operation. They should be of a triangular form, with sharp sides towards the horses, and have a point like a small plough-share.

In short, the implements of husbandry are so simple, and in so general use, it is almost

almost unnecessary to describe them. However, I will subjoin the dimensions of those which I use on my own farm.

*Small Harrows.*

F. I.

5 bounds on each half-harrow, length  
 of each - - - - 4 0  
 5 teeth in each bound—length of teeth 0 10  
 Width of harrow - - - - 2 6  
 3 flots and 1 cap to each half-harrow.

*Large Harrows.*

4 bounds on each half-harrow, in  
 length - - - - 5 0  
 6 teeth in each bound—length of teeth 0 11  
 Width - - - - 3 2  
 3 flots and 1 cap to each half-harrow.

N. B. These harrows are hung together by crooks and vartuals at a proper distance. The harrow-teeth are fastened in the bounds with nuts and screws—by far the best method.

*Rotherham*

*Rotherham Plough of the Scotch Make.*

|                                 | F. | I.              |
|---------------------------------|----|-----------------|
| Length of beam - - -            | 6  | 0               |
| — of stilts - - -               | 6  | 0               |
| Height of ditto - - -           | 3  | 0               |
| Plough-head - - -               | 2  | 2               |
| Stand-share - - -               | 1  | 8               |
| Length from beam-point to share |    |                 |
| ditto - - -                     | 1  | 6               |
| Width of stilts - - -           | 2  | 2               |
| Ditto of mould-board - - -      | 1  | 1 $\frac{1}{2}$ |
| Length of ditto - - -           | 2  | 1               |

*Old Small Harrow.*

|                                       |   |    |
|---------------------------------------|---|----|
| 4 bounds each, length of each bound   | 3 | 9  |
| Width of harrow - - -                 | 2 | 7  |
| 6 teeth in each bound—length of teeth | 0 | 10 |
| 2 flots and 1 cap.                    |   |    |

*Parkinson's Scarifier.*

|                                  |        |    |
|----------------------------------|--------|----|
| Length of the beam - - -         | 6      | 0  |
| Width at the hind end - - -      | 3      | 10 |
| Width at the middle shares - - - | 2      | 6  |
|                                  | Length |    |



|                                                                                                     | F. I. |
|-----------------------------------------------------------------------------------------------------|-------|
| Length of each side - - -                                                                           | 4 0   |
| Length of stilts - - -                                                                              | 4 6   |
| Length of the two shares for the<br>hind end - - -                                                  | 2 6   |
| Breadth over the broad end or<br>heel of ditto - - -                                                | 1 0   |
| Length of the part which fastens<br>the share, and prevents it mov-<br>ing backward - - -           | 1 6   |
| Length of the two middle shares<br>and the one near the end - -                                     | 2 4   |
| Breadth over the heel or broad end                                                                  | 1 0   |
| Length from heel to point of<br>broad part - - -                                                    | 1 2   |
| * At top of the sharp part or leg<br>of the share - - -                                             | 0 3   |
| * At bottom of ditto - - -                                                                          | 0 4   |
| Length of the part which fastens<br>the share to the wood, and pre-<br>vents it moving backward - - | 1 5   |

\* These are the same in hind end shares.

*Parkinson's Horse-hoe\*.*

F. I.

|                                       |   |   |
|---------------------------------------|---|---|
| Length of beam                        | 5 | 9 |
| Ditto of stilts                       | 4 | 0 |
| Width of ditto                        | 2 | 6 |
| Height of ditto                       | 2 | 0 |
| Ditto from the sole                   | 1 | 6 |
| Length of the rake                    | 1 | 5 |
| Width of ditto behind                 | 1 | 0 |
| Ditto of ditto before                 | 0 | 9 |
| Three teeth on the hind part, two be- |   |   |
| fore—length of them                   | 0 | 8 |

*Common Rotherham Plough of best Make.*

|                                   |   |       |
|-----------------------------------|---|-------|
| Length of beam                    | 6 | 6     |
| Stilts                            | 6 | 1     |
| Stand-share                       | 1 | 9     |
| Width of mould-board              | 1 | 0     |
| Length of ditto                   | 2 | 2     |
| Ditto of plough-head              | 2 | 1     |
| Height of stilts                  | 2 | 1 1/2 |
| Length from the beam-point to the |   |       |
| share-point                       | 1 | 7     |
| Width of stilts                   | 2 | 6     |

\* The share of the same dimensions as in the scarifier.

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## SECTION LVII.

*Method of treating Grazing Land in the most advantageous Manner : Stocking with the proper Stock according to the Quality.*

THE method of stocking barren soils with the assistance of the plough has been before laid down. All grazing land of rich quality ought to be stocked with sheep, cattle and horses, so that the grafs may be eaten clean off; for, unless it is regularly depastured, much damage ensues. Each of the above three kinds of animals prefers, as most palatable food, some grasses which the others reject; and none of them will bite near their own dung, though they may near that of others: and thus they conjointly contribute to keep the pasture level, without much expence. Pastures should be kept as level as a bowling-green, both for ornament and use; for, by one part being left higher than another, the long grafs keeps increasing in patches; and land,  
where

where it grows, may be considered as taken away from the pasture, as the cattle will almost sooner starve than eat it. By leaving the sort of grasses the animals refuse from year to year, the land increases in useless plants, and diminishes in useful ones; as the seed of such plants continually drops, and the useful ones are prevented seeding by the cattle eating them. Now were such pasture mown in those places, it would give the useful plants room to grow. It is always said, Ill weeds get up quick. So they do: on the best part of a field you will find nettles—and if suffered to grow, nothing else can; if the nettle be destroyed, the best grass will spring up.

There are in this kingdom an infinite number of acres of rich and excellent land, which, from bad management, and from want of judgment in stocking, become of no more value than a barren soil. To ignorant managers a barren is of equal importance with the finest loamy soil. To see a piece of fine fertile land with a few horses on one part, a lump of thistles in another, a  
bunch

bunch of vigorous nettles on another, and with a number of tufts of long grass which the horses never meddle with, is enough to make the ingenious industrious husbandman sigh with regret at the waste, and to blame the egregious folly of the occupier!

Were the grass just mentioned mown and given to the animals in the fold or stall, as before recommended, they would eat it, increase the dunghill; and thus the grass serve two good purposes at once. When the tufts are cut down, young eddish grows up in the place, which all cattle will greedily feed upon. If we suppose that one half of the grass-land is lost for want of good management, the farmer, by following the above method, will find himself virtually possessed of double the quantity he possessed before; but I can assure him the proportion will be much greater.

These instructions will be particularly useful to tradesmen who take a paddock at a very high price to assist them in keeping a horse, and, from want of proper management, suffer it to be over-run with long grass  
and



and weeds; for, were he to have the grass mown and given to his horse in the stable or fold, the same paddock might afford him food the year round, and perhaps to a cow during the summer.—It may be said, “A horse will eat grass a month sooner than it will be ready to mow.” That is true: but if you only mow the first year so much grass in that field as the horse has present occasion for, and make hay of the remainder, you will have sufficient to keep your horse until the grass is ready.—Another objection will be made probably to this method: “It is not so good for a horse’s feet to remain in the stable.” There is some weight attached to this objection: but I am inclined to think that great part of the lameness which horses suffer in their fore-feet, arises from the feet being kept too hot and dry. A horse is never lame from that cause, in his hind feet, which stand lowest, and are in the moistest part; nor does he by choice stand with his head up-hill. The inconveniency undoubtedly may be remedied, by letting the horse have a small fold

to

to run in ; so that when rain comes in the summer, as the litter would be wet, his feet would be moistened. A horse will naturally prefer a conveniency of this kind to a stable; except in wet weather, when he seeks the stable for shelter; or in very hot weather, when the sun and flies become troublesome. The tradesman by this means would always have his horse ready, without the trouble of driving him about the field for some time before he could catch him : and this business may be done in many instances by the tradesman's apprentice, without the expence of keeping a servant; or if done by the master himself, it would be exercise to keep him from growing fat.

In such grazing land as is intended for the purpose of feeding cattle, a few sheep are absolutely necessary to eat up the weeds. If any part of the pasture be getting into bents, or higher grass than it ought to be, and the animals begin to neglect it, you must mow it immediately, and as near the ground as possible; for the closer you cut down such coarse parts, the sweeter and the

quicker will the grass spring up in the place. Could animals by hunger be driven to eat the long grass, they would not fatten upon it; for, as the nearer the bone the sweeter the flesh, so the nearer the ground the sweeter the grass: it is not so much the quantity as the quality of the food that must be attended to.

It is a common complaint, that their land is good in spring, but it goes off. Is this to be wondered at, when one third, or perhaps one half of the field is become so rank that not one animal in the pasture will bite a mouthful of it? Suffer the very best piece of grass land, entirely free from weeds, to lie without either eating off the grass, or mowing it; and in a few years it will be over-run with weeds, have very little useful grass in it, and in fact be little better than rubbish.

## SECTION LVIII.

*Method of treating Meadow-land, and harvesting Hay.*

THROUGHOUT this Work the reader will find many instructions respecting the treatment of meadow-land, and they may all be reduced within a very short compass; manuring, watering, and cleaning. If the occupier will pay proper attention to these three articles, he need not be in fear of a scanty crop.

To shew what bad management it is to deal out manure with a sparing hand—we will suppose a farmer takes a load of hay to market, and brings no manure back. For the hay he receives four pounds, the produce we will say of one acre of land, for which he pays thirty shillings yearly rent. The next year, to his mortification, he finds a decrease in the quantity of the produce, and may think himself well off if he experiences a loss of five shillings only, and

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receives

receives threepounds fifteen shillings, instead of four pounds. The succeeding year there is again a further defalcation, and the weight of hay probably sinks to half a ton per acre, for which he receives forty shillings in cash. But his rent is invariable: that continues at the old standard of thirty shillings, and leaves only a despicable profit to maintain his family, pay taxes, mowing, making, &c.

We will now try another method of treating this land. Instead of mowing it for hay, and selling the produce, we will calculate what can be made by milch-cows, or by feeding cattle. From the price we allow for the land, and likewise for the hay, we must suppose the situation pitched upon to be near a good market; and from milking cows, making butter, and fattening calves, must we derive our profit. Amongst the various uses to which the milk may be applied, that of fattening calves is perhaps the most profitable: a calf, if properly managed, will pay five shillings per week for his keep. If you make but five pounds of  
butter



butter weekly, you receive five shillings; and there will remain milk and butter-milk to fatten a pig, which will pay one shilling per week more. In summer cheese may be made, and the profit will be nearly on a par with that on butter; for the whey may be appropriated to the feeding of pigs, though it may easily be conceived not to be so nutritive as milk. We will allow two tons of hay for the keep of a cow for twenty-five weeks, and that two tons of hay would sell for eight pounds. The cow earns per week six shillings, which amounts to seven pounds ten shillings; and for the hay she has eaten she will give back two loads of manure, the value of which, at five shillings per load, added to the seven pounds ten shillings, makes a complete balance to the price of the two tons of hay. One man may very well look after a score of cows: his wages will be nine shillings per week, which is not quite five-pence halfpenny per cow. But, not to be over nice, we will throw aside the fractions, and reckon the expence at six-pence per cow per week;

and allow the man ten shillings wages, the proportion of which to each cow will be twelve shillings and six-pence for the twenty-five weeks. On the other hand, the cutting and trussing the hay is worth two shillings and six-pence per ton ; and the carrying to market is worth ten shillings. The expences, therefore, on two tons of hay will be twenty-five shillings, supposing it sold: but if used on the farm in keeping a cow, the expence on the same quantity of hay will be only half a crown per ton—so that there is a clear saving of ten shillings per ton by eating the hay at home. But such saving is small when compared with the profit arising from the manure, by making it into a compost as before directed. There is likewise the pig-manure to be added, which may at the lowest estimation be rated at five shillings more in favour of consuming the produce at home. The cow may go six weeks dry ; but that loss will be compensated by the calf, and the allowance I have made of three pounds of butter for five weeks in my estimate.

Fattening cattle will pay as well as any  
 4 thing ;

thing; although that business may be subject to great variations in respect to profit. It is no uncommon circumstance to buy in a beast which shall pay eight pounds for the winter-feeding. To those who have not tried this method, or not been accustomed to feed cattle on hay, this perhaps may seem incredible. But on the farm at Aby-Grange we had hay grew upon land that in these times is not worth more than from six to ten shillings per acre, and that hay would feed bullocks from eighty to a hundred stone weight. We sold them at from 18*l.* to 20*l.* each, when beef was at 4*s.* 6*d.* per stone. These bullocks would have from ten to eighteen stone of fat, reckoning fourteen pounds to the stone: and I never knew any of them eat other food than hay which grew upon the poor land before mentioned, and which land never had any manure but what the cattle, horses, &c. deposited when eating off the eddish, and the greatest part of that was carried away for the use of other land.

I hope I have been able to convince the

farmer, that, by managing his meadow-land in the manner recommended, and consuming the produce at home instead of selling it and impoverishing the land, or being under the necessity of purchasing manure, he will be a very considerable gainer. His business will be more compact, and consequently done with more ease; and he will have fewer horses to keep.

As to harvesting hay, I must observe, that much of our success in feeding cattle at Aby-Grange depended upon the hay being properly got in, regular feeding, and properly ordering the cattle. In the county of Lincoln hay-makers are not so numerous as in Yorkshire. The hay made in the Yorkshire method is not much superior to straw. It is true it retains a green colour, by spreading after the scythe, turning the next day, and then tedding up at night; spreading abroad the next day, and so on until ready to cock. When first I saw hay of this kind, I thought, from the fine colour and sweet smell, that it would prove as good as corn: but as I kept a team of horses, they soon convinced

convinced me of my error; and I was obliged to purchase corn in greater plenty, or let my horses starve. I was just as much disappointed in this hay, as in grinding corn for my working horses.

The method of making hay in Lincolnshire is, after mowing, to let it lie in the swath for some days, until it gradually dries, and thus retains its juices. When sufficiently dead, turn the swath over, and the next day shake it up and spread it, give it as much of the sun and air as possible, and then cock it. In a few days after cocking it will be ready to stack. I have found this sort of hay of a more fattening nature than the hay made by the other mode, and incomparably better for working-horses. During the time I lived with my father, our hay was made in the above manner; and I never knew us give either corn, cake, turnips, or cabbage to feeding cattle in the winter, and we had as fat oxen as any I see in these days; which is a proof of the mode of harvesting hay being a good one. There are indeed some inconveniences attending the method:



method: it will be longer on the ground; but then it will be in a much safer state when lying in the swath, than when spread. Besides, in the Lincolnshire method, there is a very great saving in the expence.

## SECTION LIX.

### *Carriages most proper for Husbandry.*

IN the choice of carriages much depends upon situation; but there is one certain rule which will hold good in every situation, that is, that all carriages should be upon as simple a construction as possible.

The fewer the number of carriages a man keeps, the less his expence; for when they are not employed, they are continually going to decay. Some people are fond of a variety of carriages to do their business with: but I prefer one sort only in farming, either carts or waggons; for with either the farmer may do all that is necessary—he may  
carry

carry his hay, his corn and manure with the same carriage.

Carts are beyond doubt the cheapest and the best kind of carriages, and may be used in almost any situation. In a flat country they are preferable to any kind: in a hilly country, some objection may be made to them when loaded high; for, going either up hill or down, they are both troublesome and dangerous. But in the most mountainous countries they are under the necessity of using them, because no other carriage can so easily be dragged up hills.

A cart requires less power to draw it than a waggon, and, if properly made, will carry top-load sufficient of hay, corn, &c.: but in general carts are badly constructed. The body of a cart should be made as wide as the wheels will admit of; by which means the sides may be kept so much the lower, and the body notwithstanding hold the full quantity, besides being by so much the stronger. The sides should not be upright, but flying out gradually towards the top: and when side-boards are added, you may, by putting them

them on, increase the size of your cart at pleasure. This method is practised by the cowkeepers in the vicinity of London, who enlarge their carts so as to carry double loads upon occasion ; and it surely is the best possible means of making a cart carry a great burthen in a small compass. By the spreading of the cart at top (or shelving, as some call it) the top-load lies more snug and steady. The wheels of a cart for husbandry should be low ; for then it will be easier to fill it. The low wheels are not only the cheapest, but they are the strongest and most lasting.

Although a cart carry less in quantity at one time than a waggon, I am of opinion that more work may be done in a given time with the same number of men and horses by carts than by waggons, in the general run of husbandry business, especially where the distance is small between loading and unloading. I have always found small loads to be handy, and seldom attended by any misfortune in the shooting or tumbling out of the load. I am well convinced

convinced that carts are best for the uses of harvesting, for carrying manure, and in short for the general purposes of husbandry.

If waggons be used for husbandry, they should likewise be constructed wide and low. Manure may be carried in these sort of waggons nearly as well as in carts. Broad wheels are improper for passing and re-passing upon tillage land; if in fallow, they press all the goodness out of the soil, and make the ground so hard as to prevent its being ploughed until wet comes. On grass land, broad wheels are proper for all uses.

## SECTION

## SECTION LX.

*Of raising Foals for Use in the best Manner.  
Of castrating Foals and other Animals.*

IN raising foals for use, great care must be taken not to stop their growth by starving the mares, or by stinting them of a sufficient quantity of food ; for keeping young animals in a poor half-starved condition can never answer any good purpose to the breeder. The trouble of getting a stinted foal fat is the least of the inconveniences attending the poor keeping. A horse is intended for hard labour, and is, when grown, costly in maintaining: his constitution therefore should be well taken care of when young, by giving every possible assistance to nature.

It is a mistaken notion of some who persist in working the mares when the foals suck them ; for if a foal will not pay for the



the support of its mother, it is not worth breeding. Foals should suck till about the beginning of September. When first weaned, they must be kept in a convenient roomy house, with a low rack and manger for hay and oats. The hay must be very sweet and fine, especially at first, whether it be saint-foin, clover, or meadow: but I think carrots the best of all food for foals, as they keep the body open, which is absolutely necessary to be done.

Whatever may be the food you choose to give the foals, a small portion of corn must be added, with which you will mix a little wheat bran or pollard; and they will soon eat and drink freely.

When foals are kept up in winter, they are not to be continually immured in the stable, but ought to have a grass-close to run in, let the quantity of grass be ever so small. There should be a barn or stable in the close; and if there be a fold before the stable-door the better, as that will not only shelter the stable, but will afford the foals an opportunity of eating part of their  
food

food abroad in fine weather, and cause them to grow hardy by taking exercise, so necessary to the preservation of health. A foal kept in the stable cannot possibly take sufficient exercise, nor can he even in a small fold.

Many useful animals may be treated with success in a manner far different from that required for foals. A horse, to be useful, must have action, although many are bred almost without. In animals designed for feeding only, the more docile and tame they are, the better: they do not stand in need of exercise; for that would waste their flesh. But nothing is more conducive to the health of man, or horse, than exercise; and this maxim will be found to apply to children and foals. Exercise increases the circulation of the blood, strengthens and invigorates the muscles, promotes a regular perspiration, accelerates the animal spirits, facilitates their distribution through the minutest parts of the system, creates an appetite, and assists digestion. A foal brought up in a stable, would be like young master kept under  
the

the eye of his mother in the nursery until he were eight or nine years old. At the years of maturity horse and man would be good for nothing.

When winter is over and the grass begins to grow, the foals should be turned into some dry ground, where it is sweet and short, and where there is good wholesome water, that they may drink at pleasure. By having this attention paid to them the first winter, they will no doubt thrive the succeeding summer. The following winter they may be kept in the stable with not more care than other horses: but you may give them the same opportunity as they enjoyed the first winter, of going freely in and out. A young horse treated in this manner will, when two years old, be as fit for work as many by different treatment are when four years old, and from that age will be able to do something towards paying for his keep. And if intended for sale, he will certainly fetch a good price; for he will be well grown, active and full of spirit.

We will now consider the difference in point of expence between good and bad keeping, which will nearly make the difference of a good or a bad horse. The article of expence will consist chiefly in the corn which I recommend to be allowed him. Reckoning sixty weeks for the two winters, at one quartern of oats per day, the total amount will be twenty-six bushels one peck, which, at 16s. per quarter, will be 2*l.* 12*s.* 6*d.* extra expences for one young horse—a mere trifle when compared with the difference which will certainly be found in the value of the animal. I do not like beans, or any kind of grain for foals except oats. A foal half-starved in rearing never, or very seldom indeed, recovers the injury he receives when young, and cannot be expected to make a horse of value.

I cannot quit this subject without giving a particular piece of advice to the master of the foal :—Let him *see* that his foal receives with regularity the allotted quantity of one quartern of oats per day : it is probable, if the master observes this caution, that his

foal

foal will thrive better than if he *ordered* half a peck per day to be given him by his labourer or other servant.

I do not pretend to say that all young horses are worth corn : I believe there exist thousands in this kingdom who have consumed more than they were ever capable of earning ; but those I have been speaking of are horses of value, whether for the saddle or draught. There are many not worth raising on any sort of food. A horse that in his prime will not sell for more than from six to ten pounds was never worth half what he cost the breeder ; as the covering the mare, her keep, and other incidental charges, are to be considered : and I will venture to say, that if a horse does not fetch twenty pounds at the age of four years, he does not pay the breeder.

Horses should only be bred where land is situated so far from a market as to make it inconvenient to dispose of the produce : but there is no animal pays so well, provided you are careful in the breed. If a little more care than is generally practised were observed, the breed undoubtedly



would be better ; for there is certainly room for improvement. A farmer goes to a fair with an intention of buying a mare to carry him on the road—a low-priced one certainly. If the fair is of any repute, it will be crowded with horse-dealers from different parts in search of horses of all descriptions : many of these horse-dealers will have commissions from gentlemen to purchase without respect to price ; and although the farmer may have had judgment to pick up any thing tolerably active and clever, the horse-jockeys are ready to run over one another to buy it of him. The farmer, for the sake of a great profit, sells his mare, and puts up with a sorry, stumbling, tumble-down jade ! lame, blind, or with some other natural blemish. As he does not find it an easy matter to dispose of his bargain again, he gets his mare covered by a stallion of the same stamp ; for half the stallions belonging to chapmen are either lame or blind, as they are sometimes unable to purchase one until by some defect he is rendered unfit for a gentleman ; as a good  
stallion

stallion costs a considerable sum of money. The owner of the stallion tells you he is not a jot the worse for being blind; it was the effect of a violent cold or fever which fell into his eyes. And when the foal is dropped, it is neither lame nor blind: but by the time it gets to be four years old the eyes are found defective, they grow worse, and the breeder, not being able to sell him or her, finds himself possessed of a five years old blind horse. So it will be in breeding from either stallion or mare with natural defects, whether they be blind, lame, or tumblers.

But the breeder determines to cross his breed, that he may have a coach-horse; as his mare is rather too weak to carry him and his wife. The stallion he makes choice of has so little action, that he will tire in travelling at the rate of seven miles an hour before he has gone twenty miles; he has a large head, long legs, is ugly all over, (though by his being very fat, his ill shape is in some degree concealed,)—in short, such a one as, were he a gelding, would

not fetch ten pounds in a fair! Now, what can be expected from foals so got and bred? If they ever fetch twelve or fourteen pounds apiece, the breeder may think himself lucky. I have always thought that the likeliest method to breed of any particular sort, action, or colour, is to choose the male and female accordingly: and so of disorders.

To breed for profit—Let the mare be a tried good one, such as has been really worth fifty or a hundred pounds; and whatever blemish she may have, take care it be an accidental one only, and not a natural one. Let the stallion answer the description in every respect as the mare. The foal may then be expected to fetch a high price, and not cost more, perhaps not so much, in rearing, as a bad one. To encourage the breeder to pursue the plan recommended, I will tell him a short anecdote within my own knowledge.

A neighbouring farmer sold a well-bred hunting mare, four years old, to a London dealer, for fifty pounds. When she was offered

ferred for delivery the dealer had repented of his bargain, and refused to accept of her, pretending she was lame: the farmer took her back without grumbling, rode her to market, and made her carry sheep-skins, butter, eggs, &c. and hunted her in turn during the next winter—in short, she was a horse of all work. In August following the same horse-dealer came again, and, in the course of conversation, enquired what the farmer had done with the mare. The answer was, he had her still. “Ah, ah!” replies the horse-dealer, “I thought you would not easily get rid of her.—Lame as a cat, I suppose?” “You are mistaken,” says the farmer; “she is perfectly sound, and has never been lame since.” The dealer desired to see her; she was led out, and he immediately told the farmer he was ready to pay him the fifty pounds for her. “No,” says the farmer, “that will not do now: you must double the dose; the least I will take is one hundred pounds, not a farthing less.” After much haggling the dealer paid down the hundred, and took the

mare away. This mare will be allowed to have paid well for corn. She was got by a son of Atlas out of a half-bred mare.

If breeders in general would pay as much attention to the breed of horses as Mr. Bakewell did to the breed of sheep, they would no doubt improve them in an equal degree, and find their advantage whether they bred for the collar, for the road, hunting, or racing. Mr. John Hutchinson has shewn his knowledge of the art of breeding by the number of good racers he has produced; and he always puts the best proved racing stallion to a thorough-bred mare that has given undoubted proofs of her qualifications. Such as these are certainly more likely to breed good racers than a mare and stallion who every time they have been tried have been distanced.

If any one doubts the necessity of keeping animals in a thriving state while young, especially of giving them sufficient exercise, they have a cheap and expeditious method of making the experiment. Take two greyhound whelps from the bitch, of the same



same litter; keep one in good condition, and the other poor. That which is kept poor will never recover the ill treatment he received when young. This experiment I have known frequently tried. The best time for castrating colts is when they are three months old. In this respect, as in many others, many will differ from me: but my assertion is grounded on experience. As to the time of performing the operation, I prefer hot weather, when the flies are very strong, and when the foal sucks; for the warm milk is of great service by keeping the body of the foal open, and accelerates the cure. By the mare's continually moving about, the colt will of course follow: exercise causes the blood to circulate, a suppuration without festering takes place, the discharge of pus will be gentle and easy, and the wounds gradually heal.

The above operation is frequently performed at a very improper season of the year, and at an improper age in respect to the foal. It was a custom with my father  
and

and other farmers in our neighbourhood to cut colts in April or May at a year old; and great inconveniences and losses have arisen from the practice of cutting them at that time. Some would not have them cut until they are three or four years old, which I disapprove of very much. If you let a horse go long with his stones, he begins to shew courage from them: and when they are taken away, he becomes more dull and sallow than if he had been gelded when young: he cannot pine for the loss of what he never knew; and much danger has attended the delay. I preferred the month of July, and never once failed of success. Three months I think the most proper age.

It is necessary to keep the colts with their mothers in the stable a few hours prior to performing the operation, that they may cool and empty themselves. If the weather should turn out rainy before the wounds suppurate and discharge, it will be advisable to take them into a stable for shelter, to prevent their catching cold, which may

be attended with bad consequences ; as great caution should be observed in every instance that animals are not exposed to the wet where colds are feared.

A colt that has gone uncut until he is a year old or more, and who is kept in the stable, and cut perhaps in the month of April when the weather is frequently cold, is liable to swell much. In such case, when you find the parts inflamed, and the lips of the wounds adhere so closely together as to inclose the matter in the bags, thrust your finger into them, and make a sufficient aperture for the free discharge of the pus or matter ; and if the inflammation be violent, or the swelling large, divide a peeled onion, and put it into the orifices.

The method used at present in castrating a foal or young horse is by cutting open the cod or scrotum, nipping the string with a pair of sheers made for the purpose, taking out the testicle, and then, to stop the bleeding, searing the string with a red-hot iron. Now this might be done with greater safety, and with less pain to the animal,

mal, by what is called *twitching*, or by tying round the part tight with a string, which would gradually eat it off, and prevent the air from getting in to irritate it; for if the air get in, inflammation and mortification frequently ensue. Male animals might be castrated by *twitching* with much greater safety, and any one might do it; it is so very simple that the animal by this means would not suffer such violent pain as must be the case at the time, and therefore would not waste so much in his flesh, or be so liable to die. If, when extracting the testicle from a lamb, you examine the length of the string, you will be convinced that it must come from the very vital part of its loins: How painful as well as dangerous then must be the operation? Indeed, I have known great numbers die under it: and I am of opinion, not one animal in a thousand would die if castrated by twitching.

Lambs ought to be castrated when about six days old, and in fine weather: but, if twitched, the weather would not be of so much consequence, nor would their age, provided



provided it were done before fly-time. I should advise to twitch them when about a fortnight old. This manner of castrating makes the leg of mutton much handsomer. Calves undergo the operation at the age of six weeks ; and, although I never knew an instance of a calf dying from castration, I should prefer twitching him.

Pigs should likewise be twitched ; as I have known them die very often from being gelded according to the common method.

You may twitch animals of any age with safety, if you attend to the following directions : Take a cord of strength according to the animal's age and the size of the part to be twitched, wax it with shoemaker's wax, and then grease it that it may slide with greater facility. If the part be likewise greased, it will twitch the better. Then tie the string tightly round the cod or scrotum, above the testicles, so that the circulation of the blood and other fluids to and from the testicles may be totally interrupted. The scrotum and its contents will  
thus



thus soon be deprived of all sensation, rot and fall off. For twitching, a peculiar knot is used: the manner of forming it may be learned from the annexed plate.

The above directions are drawn from my own experience in castrating tups. I have twitched many hundreds, and never lost one. I have, indeed, known them die; but that was owing to bad management, by cutting off the cod and stones as soon as twitched; for in that case, if the part be not twitched tight, cold may get in and kill the animal. If you leave the part on, that cannot possibly happen; therefore on no account ever cut it off. Spirits of turpentine are generally used for rams, but must not to horses or bulls by any means. I do not think there is any occasion to apply any thing but grease, and that only to aged animals.

## SECTION

## SECTION LXI.

*Breaking of young Horses, &c.*

I DO not know any thing more misunderstood than the breaking of horses. This is generally done by some idle drunken fellow, who, if he had ever so quiet a horse to ride, would frequently be so intoxicated as to fall from him several times in a week's riding; and after he is able to recover himself and get upon his feet, he will fall to beating the horse in the most barbarous manner; a treatment he never after forgets.

In general, as soon as the horse is haltered, he is tied to a tree and buffeted over the head with a hat, which he ever after dreads so much, that if any one meets you on the road, and takes off his hat, the horse supposes he is going to be buffeted, and jumps away. The next thing is to tie a string round his lisk, which tickles him so  
that

that he learns to kick. They next, with a long whip, whip him round a circle with a long rope ; then tie up a foot ; then get him upon some ploughed land or some boggy hole, and, when he is almost heart-burst by whipping about, some fellow, for a tankard of ale, is induced to mount him. This egregious horse-breaker, who only became such from a habit of intoxication, gets drunk with some of his companions, and tumbles off. Hence the horse is branded with the character of a vicious horse, is allowed little or no meat, and disturbed of his rest. Now, by all this cruel treatment, if it be a spirited animal, he is irritated into a state of madness, and becomes altogether untractable.

The following is the best mode of managing young horses : When you take the foal from its mother, halter it, and lead it about. As soon as it patiently submits to be led, tie it to the manger, let it be rubbed with straw-whisks, take up its feet and clean them. After it suffers you to do these things with ease and satisfaction to itself, let it

it go into the paddock or place you intend to keep it in. It may be necessary to observe, that one person should feed the foal, dress him, &c. Continue to halter him when occasion requires, and lead him about, as he will never forget the lessons given him. When you want him for use, let him be put amongst a team of horses, with a blind halter, and every accoutrement the same as other horses have; but take care he has nothing to pull. Of the team of horses two ought to be behind him, and one before him; and the person who drives should not meddle with him in any respect, but let the other horses draw him about. Do this repeatedly until he becomes gentle: then cause some one to ride him: in that situation he cannot plunge so as to throw any one, because the other horses will keep him from rising up. I never saw any horse so treated inclined to throw his rider.

Thus the breaking of this horse has cost nothing; he soon becomes manageable, and earns his meat: but then, alas! he has not got what is termed a *mouth*. To make him

have a mouth, the horse-breaker puts a bridle with a very large bit into the mouth of the young horse, and reins him very tight up, until his mouth is so sore, that, when he mounts him and draws the bridle, the horse runs backward, and, while his rider endeavours to force him forwards, rears up and tumbles backward. Thus he contracts a very bad habit. On the contrary, if the horse has had the small bit in his mouth hanging loose, he becomes used to it; and you may draw him about as you like, and he will feel no inconveniency from it. It would be better if the bit of the bridle were lapped with cloth, to prevent his mouth getting sore; for, if ever a horse's mouth (viz. his gums and lips) is excoriated, the part, when healed, will be callous, and have less sensibility in it than any part about him, because there is not a free circulation of the blood in that part. The horse-breaker will endeavour to persuade you he will make any horse ride round in his fore-hand, and light in hand—make him walk well, trot well, and gallop



as fast as Eclipse. He may as well say he will make him live in water like a fish ! Nature has formed the horse such as he is : the only thing required is to make him quiet, and do all he is able with pleasure. The breeder of the horse must make him gallop fast, ride light in hand, &c. by choosing a mare and horse proper to breed him from.

## SECTION LXII.

*Rearing Calves for Stock in the best and  
cheapest Manner.*

TO rear calves properly requires a great degree of attention. If calves are reared with milk at the kit (which is the second-best method, sucking the cow being undoubtedly the first), the milk, being skim-milk, should be boiled, and suffered to stand until it cools to the temperature of that first delivered by the cow, or a trifling degree

more warm, and in that state be given to the calf. Milk is frequently given to calves warm only ; but that method will not succeed so well as boiling it. If you give milk over cold, it will cause the calf to skit or purge. When this is the case, put three spoonfuls of rennet in its milk ; it will soon stop the looseness. If, on the contrary, the calf is bound, bacon-broth is a very good and safe thing to put into the milk.

One gallon of milk per day will keep well a calf till he be thirteen weeks old. A calf may then be supported without milk, by giving him hay, a little wheat-bran once a day, with about a pint of oats. The oats will be found of great service as soon as the calf is capable of eating them. The bran and oats should be given about mid-day : the milk, in portions, at eight o'clock in the morning, and four in the afternoon. But whatever hours you choose to set apart for feeding the calf, it is best to adhere to the particular times ; as regularity is of more consequence than many people think.

If

If the calf goes but an hour or two beyond his usual time of feeding, he will find himself uneasy, and pine for food.

The farmer need not be alarmed at my recommending bran and oats; for the expence of both will not exceed one shilling per week, supposing one quartern of bran, and a pint of oats per diem; and this food will be found of infinite use to the calf, not only in respect to clothing him with flesh, but likewise keeping his body open, and by that means contributing to his health. Calves reared in this manner are apt to suck a rope-end, or any thing of that kind, or they will get hold of another calf's ear, or perhaps his pizzle; by which means they will draw in such a quantity of wind as will make them heave as if they were ready to burst. The giving them oats and bran will prevent this; especially if you take the precaution of tying them up close, for that every one will allow to be a sure preventative.

It is always to be understood, that calves

reared in this manner are to be enticed to eat hay as early as possible; and the best way of doing this is to give them the sweetest hay in your possession, and to give them little at a time. Turnips or potatoes are very good food, as soon as they can eat them; and they are best cut small, and mixed with the hay, oats, bran, &c.

It is not absolutely necessary to give milk to calves after they are one month old; and to wean them gradually, two quarts of milk, with the addition of linseed boiled in water to make a gruel, and given together, will answer the purpose, until by diminishing the milk gradually the calf will soon do entirely without. Hay-tea will answer the purpose, with the like addition of two quarts of milk, but is not so nutritive as linseed. Hay-tea is made in the same manner as we make the decoction from the Chinese leaf, only in a larger quantity than ladies generally make it for breakfast. My method is to put such a proportion of hay as I think will be necessary into a tub, then to pour on a sufficient

cient quantity of boiling water, cover up the tub, and let the water remain long enough to extract the virtues of the hay.

When you boil bacon or pork, preserve the liquor or broth, to mix with milk for the calves: it is excellent food.

I have reared a calf in summer on whey only; and it has prospered. But calves reared in winter must be fed with hay: clover-hay is the best of any for the purpose.

Soon after the fatal distemper amongst the horned cattle, many calves were raised with porridge of different kinds, without any mixture of milk. My father, at the time of the contagion, raised one in that manner, which at the age of six years weighed one hundred and twenty stone.



## SECTION LXIII.

*Management of Rabbits; what Land proper for a Warren. Means of improving Land by Rabbits.*

THE most necessary precaution to be observed, with respect to rabbits, is to prevent their being destroyed by their numerous enemies, particularly foxes, fowls, or weasels, gleads, hawks, &c.

In great snows, or stormy weather, they must be served with some sort of food. For this purpose it will be necessary in hay-time to set up a stack in the middle of the warren, amongst or near the burrows, banked round; and when the stack-garth is thrown down, the bank makes an excellent burrow for the rabbits to breed in. The boughs of trees are good for rabbits at such season and in such weather, as they are fond of peeling and eating the bark.

Those rabbits which appear weak and poor should be killed off in the proper season,

season, for they frequently die in the burrows ; by which means both the flesh and skins are lost : and should they survive, they will not add much to the next year's produce.

The most proper situation for a warren is a gently rising ground, with an aspect between the east and south, rather inclining to the east, if the ground will suit, on account of the morning sun. The most suitable soil is a sandy one, dry and warm, that the burrows may be comfortable to the young ; for they are very tender, and liable to perish with little wet or cold. If the land is a clay-soil, the rabbits are disgusted with the trouble of making their burrows, and are tempted to look out for a lighter soil. Wet or marshy land is by no means fit to breed rabbits on.

Rabbits are of a very feeding nature, and on the poorest land will get fat in mild weather ; but dry frosty weather, without snow, suits them the best by far of any.

To turn a warren to the greatest advantage, if there should be any part of it fit for  
the

the plough, the best method is to fence it off with a sod wall, and then to plough and sow it with such crops as it will bring, until the freshness is nearly worn out. Then lay it down with grass-seeds, throw down the bank that inclosed the piece, and let the rabbits in upon it; by which means you will have a most excellent burrow to breed in. The new seeds will make excellent feed, and cause them to increase abundantly. This is a mode of improving land at a very small expence, and will be found to be exceeding profitable. It is the best I know of; for such land as is generally appropriated to the feeding and breeding of rabbits, can seldom be sufficiently improved to feed a bullock by the greatest adept in transmuting substances.

There certainly are many thousand acres of land in this kingdom which might be much more properly applied, and more profitably, by breeding rabbits than by their present management. To attempt a rotation of crops, as directed in this work, on some land is a waste of time and money.

But

But such land as lies compact, I mean in a form as nearly circular as possible, and that is as near the description before given in respect to soil, will be found to yield the most profit by being converted into a warren,

## SECTION LXIV.

*Observations on Rape; Difference between Cole and Rape: Reasons why Rape-seed does not injure Land.*

RAPE ought to be drilled, in the same manner as described for the culture of peas and turnips, in Section XII, with manure in the drills; and, like peas and turnips, should be cleaned in the spring by the plough. This, if properly done, would make the land equal to the best fallow in the kingdom. The falling of the leaves, and the smothering of the crop, would keep it in a perfectly mellow state; and if the straw and roots were immediately cleaned off, the ground

ground scarified, and a sufficient quantity of seeds sown, there would be a crop of rape to be eaten by sheep betwixt the time of reaping the rape and that of sowing wheat. This, instead of impoverishing, would improve the land in a very considerable degree, and intermix the manure in the best possible manner. It is to be recollected that rape has two years' rent upon it, and without some management of this sort cannot turn out so profitable a crop: but by the mode here recommended you get a crop and a half in two years.

Rape-straw ought, like other straw, to be preserved for manure: and although it be not fit for food, it will answer the purpose of litter. It is generally thought that rape-straw affords little manure. So would every other straw were it burnt, as is practised with that of rape; but no straw will yield so much in ashes. We well know there is more bulk in rape-straw than in any other sort, and I am of opinion it is also heavier.

Rape is a succulent plant; and, as it is agreed by the best botanists, that when rain falls



falls a salubrious manure drops from the leaves of such plants, why should not the leaves collected make good manure? Surely it is worth while making the experiment. I have known land produce rape fourteen successive years, and bear the seven crops without being manured in that time. I am of opinion, that, had the rape-straw been laid in the fold-yard, worked up into a compost, and then put in drills and managed as before described, it would have improved that very land as much as some sorts of manure in use. He who sowed the rape just mentioned acquired a fortune of near thirty thousand pounds by farming. It was looked upon as certain by all the neighbouring farmers, that this repeated succession of rape-crops must inevitably ruin the land: but when, soon after his leaving the farm, it was cleaned and thrown into a rotation of crops, they never were deficient where the rape had grown, as I observed before, for fourteen successive years. I think it a mistaken notion in those who so positively assert that land is considerably injured by  
being

being sown with rape to stand for seed ; for if rape intended for seed is sown in drills, moulded up in the spring, and hand-weeded as often as necessary ; it would certainly be one of the best fallows that could be made for wheat, provided the manure is not forgotten to be put into the drills.

The farmer need be under no apprehension of loss in making the above experiment. I can assure him of success, provided he follows exactly the method laid down. In respect to harvesting rape-seed, I would, as soon as it is shorn, have it put in narrow stacks, in the field, or some convenient place, as the stalks of rape would prevent its heating ; and if in an airy situation, it would harvest properly, and be a great saving of seed. Those who are in possession of the threshing machine might save much money by threshing the rape with it ; and the straw, by being more broken, would make better manure than heretofore by the old method.

In respect to the difference between cole and rape ; in the seed, it is scarcely possible

to

to distinguish them; but when in plants you may easily tell one from the other. Cole in general is intended to be eaten with sheep, and rape to stand for seed to be manufactured into oil, which is used in such large quantities by the clothiers, by other artificers, and likewise in physic. Cole, however, is likewise frequently sown like rape, for the purpose of standing for seed, from which oil is expressed. Cole grows to a greater height when in leaf than rape; and the stalks are so soft and pulpy, that sheep can eat them very near the bottom. Rape is of a hardier nature, more calculated to stand the winter: the stalks are rigid, grow bushy, and branch much, and, when spring approaches, spread and yield more seed than cole. These seeds are most frequently, I think I may say always, intermixed. It would therefore be well worth while for a grower to collect with care out of a crop the different seeds, and to sort them properly; for cole is to be preferred for feeding sheep, and rape for the purpose of extracting oil.

A strong

A strong rich soil is most congenial to both rape and cole. Where nature has not been bountiful in that respect, art must supply the place; and the best way to succeed is, to follow the method I have laid down.

## SECTION LXV.

### *Observations on Saintfoin and Lucerne: Culture and Use.*

SO much has been already said in the beginning of this work respecting saintfoin, that I will not tire the reader with repetitions, but refer him to Section XIII. As to its great utility, and the general method of culture, I now confine myself to the laying down of my ideas respecting an improvement in sowing; and even in that respect I have little more to say than that I would recommend it to be sown in drills. And if it were sown at the same time with barley, the saintfoin seed would

would be in the same rows : but then the barley must be sown thinner, or it must come up before the saintfoin be sown. If the barley were sown six inches asunder, drills might be made betwixt each row for the saintfoin seed : but I prefer sowing barley every four inches, and the saintfoin seed along with the barley ; by which means the seed would be more dispersed over the land.

As saintfoin is a smothering crop in the spring, it is very seldom that the growth is impeded by weeds ; and the grasses do not grow so early, nor can they injure the saintfoin unless it is very thin. There is no doubt but that smothering land with a crop is better than having recourse to ploughs, harrows, scarifiers, &c. day by day to destroy weeds, for such labour is expensive ; whereas a large crop is attended with profit. If saintfoin were sown alone in drills six inches asunder, and the earth between each row lightened by the scarifier, I do not believe any method could possibly produce a more plentiful crop.



Lucerne is chiefly used as green fodder. The leaves grow three at a joint, like those of clover; its stalks are erect, and, after mowing, immediately spring up again from the stubble or cut stumps. If it is made into hay, the treatment is the same as that of saintfoin: but it must be mowed before it flowers. It makes the sweetest food, and one of the most fattening hitherto known for cattle; but must be given with much caution, or it will cause them to swell.

Lucerne is best drilled at such a distance as to admit of being moulded with a plough, so as to have an opportunity of tilling the land betwixt each row, in the same manner as described in the pea-fallow. But two feet is too much to allow between the rows: the seed might therefore be sown at only twelve inches distance, and a plough may be made of six inches sole to clean between the rows; for a plough is by far the cheapest instrument for cleaning land, and may be made to answer better than any implement I know of.

S E C.

## SECTION LXVI.

*Remarks on Flax ; Culture, and Management  
till ready for Use.*

FLAX is chiefly sown on sward-land, wharp or clay ploughed up for the first crop : but it will thrive in any land that is tolerably clean and good, if it has lain in grass a reasonable time. The land should be ploughed early enough in winter to have the benefit of the frost, as the mould cannot be too much broken or pulverised. When the land is well laid, flat and even, sow the seeds in mild open weather, towards the latter end of March, or very early in April. The East-country seeds are by far the best, and, though at first the dearest, will be found cheapest in the end. These will answer for two, or perhaps three crops ; after which it will be necessary to change the seed. Of the foreign seed two bushels are sufficient for an acre : but of the home-seed

it will be adviseable to add half a bushel more.

When grown up, flax ought not to be gathered before it be fully ripe; for, if pulled before the blossom falls, it heckles away almost to nothing; and though it seems fine to the eye, yet it has no substance, and the yarn spun of it is weak and ouzy. It not only wastes in the washing, but such linen as is made of it becomes extremely thin in the bleaching.

Flax is a very uncertain crop; and I do not recommend it to the farmer as a profitable one. I am not fond of it, for it contributes nothing to the dunghill, though sometimes it may put much money in the farmer's pocket when it happens to be successful. I have known a crop fetch fifty pounds per acre. If the season proves wet, much weeding will be necessary, which, together with the price of the seed, will be found very expensive. I am of opinion that a considerable saving might be made by depositing the seed in drills; for by that method the land might be kept in such a  
state

state as to be easily made ready for wheat ; especially as flax is so soon off the ground. A crop of flax is often followed by a good crop of wheat.

At present flax is weeded by hand ; and that expence, as it depends so much on circumstances, cannot be ascertained to any tolerable degree of certainty. The pulling is worth half a guinea per acre. If flax is intended for white line, it should be pulled when it just begins to turn yellow. This is absolutely necessary to be done when the crop is too strong and roid, otherwise it would rot at the bottom and spoil. The pluckers should tie it up in handfuls, set them up till perfectly dry, and then house them. Flax pulled in the bloom proves whiter and stronger than if left standing till the seed is ripe ; but then the seed will be lost.

That which is intended for the finest sort of line must be immersed in water and swingled. If the crop be not over strong, it will be of most value if it stand for seed ; but then the line will be black, and not fit

for fine linen. A good clay or loamy soil generally produces the best crop of flax.

When you put the line in the pits, let them be filled with soft standing water. It is a very good method, after the line is in the water, to cover it with fods ; for by that means it will rate sooner, and much more even : and if it is trodden hard down, it will be the better for it.

To know when the line is fit to be taken out of the pits, you must take some up, and if the bafs divide from the bunn (as it is called) it is then ready, and should be immediately taken out. If it remains in the water longer than necessary, it rots and is totally spoiled. When taken out, it must be laid thin upon the grafs, and spread to be dried : when dry, tie it up in sheafs and house it. Then brack it with a pair of bracks, swingle it with a swingle-handed stock, and just heckle the top end slightly ; and it is ready for the heckler. The expence attending this process may be estimated from fourteen pence to half-a-crown per stone.

Some-



Sometimes flax is suffered to stand until nearly ripe, when the boll which contains the seed is pulled off, by which method the seed is saved without much injury to the line: but this advantage can only be taken upon good clay land.

## SECTION LXVII.

*Hemp; the Culture and Management till ready for Use.*

HEMP is managed in every respect like flax, though of a very different nature; for it cannot be raised to advantage but upon very good land. Wharp is the best to grow hemp upon, and next to that a warm, sandy, or somewhat gravelly soil; but it must be rich, and of good depth.

The best seed for sowing is that which is brightest, and retains the colour and substance in rubbing. Three bushels are sufficient to sow an acre; but the richer the land is the thicker the seed must be sown,

and the poorer the land the less of seed. The time of sowing is from the latter end of March to the end of April, according as the spring is forward or backward: but, certainly, the earlier it is sown the better. Birds of most kinds are very fond of this seed, and too much caution cannot be used against their depredations.

The first season for gathering it is about the beginning of August, when the fimble or light hemp which bears no seed will be ripe. When it becomes ripe, the stalks grow white, and the leaves turn yellow at top, and fall downwards: it must then be pulled up, dried, bound in bundles as big as may be grasped in both hands, and laid by for use. This may be called the first crop. Care must be taken not to injure what is left standing, because that is to grow till near Michaelmas before it will be fit to gather. This last is what is called harle-hemp. When it is gathered, let it lie abroad for three or four days, that the sun and wind may dry it; and you may then either stack  
or

or house it till you are ready to thresh the seed out.

A good crop of hemp is about equal to a good crop of flax: but the first crop, or fimble hemp, is not worth above half as much as the other. The great burthen of leaf it carries when green, from which it is said an excellent manure drops upon the land, makes some esteem it the best management of any to follow hemp with a wheat crop.

Hemp is a very proper crop to be drilled; as drilling so greatly facilitates the cleaning of the land, and is a real saving in many other respects. This crop, if suffered to stand till ripe and fit for pulling, will be from ten to twelve feet high.

As to the mode of preparing hemp after the seeds are threshed out of the heads, the management is very similar to that of flax. The stalks are laid up in bundles, and steeped in a pond of standing water—the cleaner the water, the better; they are fastened to poles, and left to soak about a fortnight, till you find the substance of the stalk almost

rotten : the bundles are then taken out and well dried.

When hemp has been well soaked and dried, it is bruised by small quantities on blocks, with beetles or large mallets : the bullen, which is the inward substance of the stem, flies off in shivers, by the force of the blows ; and nothing remains in the hands of the beater but the thin bark in large threads, through the whole length of the stem. These parcels of threads are afterwards hung on a perpendicular board, and bruised with a wooden beetle, to beat out such little straws as may remain of the bullen. All the gross parts are now separated from the stem, and the threads of the bark receive their perfection from the comb or hatchel.

## SECTION LXVIII.

*Burn-baking, with Experiments thereon.*

BURN-BAKING consists in burning earth of any kind that will burn to about half the consistency of a brick. Clay seems fittest for this purpose. The operation is very simple: let a fire be made of any combustible you please. Where coals are scarce and dear, wood of any kind will do; but the roots of oaks, or any hard wood, are best. When the fire burns sufficiently strong, clay must be carefully and gradually laid on it, taking care not to smother it. When the clay becomes ignited, lay on more, and it will of itself continue to burn without any additional fuel. A free circulation of air being absolutely necessary, the fire should face the wind; and it must be attended night and day, as the sun or rain would extinguish it.

The



The expence, at present, of burning fifty cart-loads of clay, which is sufficient for one acre, is as follows :

|                                               |   |       |    |   |
|-----------------------------------------------|---|-------|----|---|
| A tun of coals                                | - | £. 0  | 15 | 0 |
| Wages of a man, fourteen days, at 2s. per day |   | 1     | 8  | 0 |
| Cartage after it is burnt                     |   | 1     | 5  | 8 |
|                                               |   | <hr/> |    |   |
| Total expences                                |   | £. 3  | 8  | 8 |

Where the clay is prepared, women and children, with a man to superintend them, may be employed to light and keep up the fires. Thus very large quantities might be burnt at a trifling expence.

As most luxuriant crops grow on the spots where the fires had been, the more ground is burnt over, the better. Where ant-hills and sward are ploughed for that purpose, the fires should be kindled in rows ; and by cross-ploughing the soil may afterwards be intermixed and made more equal. There are many kinds of land in the kingdom that might be improved by this method ; particularly four poor clay soil, such as abounds  
about

about Stamford and Grantham in Lincolnshire, which, without being meliorated by art, will not produce an abundant crop when first ploughed up. The improvement of such land should be undertaken in summer, when the weather is dry. The surface and ant-hills must be ploughed, and burnt on the ground, and the ashes spread over it. This is a good preparation for wheat or rape to stand for seed; as either of these crops will give sufficient time for the operation. The following is a profitable rotation of crops after burn-baking: first year, rape; second year, wheat; third year, beans or peas drilled; fourth year, barley or wheat; fifth year, clover; sixth year, wheat; seventh year, fallow and drilled turnips; eighth year, barley and grass-seeds. Now the land will be in a proper state for grass again; the soil having been pulverised, and improved to a greater degree than by any method yet practised. The refuse of the two first years' crops, prepared according to my directions, will have furnished a sufficient quantity of manure to be put into the drills

drills with the beans or peas ; and the crop of peas or beans and of barley, a sufficient quantity to be worked up into a compost to be laid on the clover in autumn, after the barley is reaped. This will have insured a good crop of clover, and of wheat after it ; and the manure arising from the clover and wheat laid in the drills with the turnips will have promoted the growth of them and of the barley. From the barley-straw a compost should be prepared, and laid upon the grass as a top-dressing. This should be done, after depasturing it the first summer with sheep, &c. in the autumn, when the seeds have fallen from the first year's produce. Spread the manure over the land and bush-harrow it : but permit no sheep or cattle to go upon it, until in the spring the young grass springing from the seed that had fallen in autumn shall have sufficiently taken root ; for as clayey land, after it has been ploughed, does not easily reproduce sward, every possible encouragement must be given it.

The ashes being spread on the land after burn-baking, the lumps should be pulverised

before ploughing. The least expensive method of doing this is with a roller, and with a bush-harrow, or a heavy gate with thorns interwoven into the bars, which is drawn over the land after it has been broken with the roller. If, after rolling and harrowing the first time, the soil be not fine enough, repeat the operation, till the pulverisation be complete ; or great losses may ensue, as little or no vegetation can be sustained by a large lump like a brick.

In burn-baking clay, as in burning fods, the fire should not blaze, but smother slowly, as the ashes thus procured are of a better quality, there being no exhalation from them.

When clay-land has been ploughed for some time, and impoverished, it is apt to crack and set in dry weather so as in a great measure to prevent vegetation. By burning such clay, the soil would be enriched, and its bad qualities considerably diminished.

Sand is the only soil that will not burn ; sand therefore cannot receive any improvement

ment from burn-baking, except by burning clay and carrying it to a sandy field. But I am of opinion that clay in its raw state would be of more lasting benefit to such soil.

Clay where rushes grow may be worked to very great advantage by burn-baking. Where swath or ant-hills are not to be had, clay taken from the bottom of ditches or grips may be used.

Moor-land would raise a very large proportion of ashes, which at an easy expence might be carried to clay-land, and used as manure in drill-crops. But where clay can be procured, it would be of great utility to burn it, and lay it on moor-land as manure for drill-crops; as, when such a mode of culture is adopted, abundant crops are raised with so much less of every sort of dressing.

To save the expence of breast-ploughing, or paring by men; the clay, &c. for burning may be ploughed up with the common plough, as there need be no fear of burning too much of the soil. The expence indeed of burning a very large quantity is greater :  
but



but the farmer would be amply reimbursed by the abundance of the produce. I know a gentleman who ploughed a field as deep as the plough usually goes for a crop, and burned the whole; and a most luxuriant crop of barley grew upon it—so much so that on the sides of the fires there was ten times too much.

The sort of plough proper for making land ready for burn-baking is the Raucliffe plough, used in the low and marshy parts of Yorkshire to pare land, instead of breast-paring by men. It is usual for men to do this with this sort of plough, and find their own horses, at 4s. 6d. per acre; but where ant-hills abound, it would require a stronger team, and therefore cost more money. Oxen would do this work very well; for, by going slow, they give the man an opportunity to plough with greater deliberation. The ploughs upon rushy, haffocky land have wheel-coulters, which steady it much; and in a great measure prevent its going different depths: but the wheel-coul-

ter cannot be applied where large ant-hills or stones are in the land.

Some years ago I tried an experiment on land intended for grass, by burn-baking without ploughing it: but it did not answer, probably from the soil's not being pulverized and mixed.

Land once fertilized by burn-baking may ever after be kept in good condition, by returning upon it the manure arising from the luxuriant crops.

As the practice of burn-baking is new in many parts, it may not be amiss to make a calculation of the expence and profit from one acre.

*Expence for Eight Years.*

*Profit for Eight Years.*

| First Year, RAPE.                         |     |    |    |                          |      |    |    |
|-------------------------------------------|-----|----|----|--------------------------|------|----|----|
|                                           | £.  | s. | d. |                          | £.   | s. | d. |
| To one acre ploughing                     | 0   | 5  | 0  | By one half last of seed | 15   | 0  | 0  |
| Burning                                   | 0   | 10 | 0  |                          |      |    |    |
| Spreading, rolling, &c.                   | 0   | 3  | 0  |                          |      |    |    |
| Ploughing, and sowing with rape-seed, &c. | 0   | 8  | 0  |                          |      |    |    |
| Reaping & thrashing                       | 0   | 10 | 0  |                          |      |    |    |
| Rent and assessments                      | 1   | 10 | 0  |                          |      |    |    |
| <hr/>                                     |     |    |    | <hr/>                    |      |    |    |
|                                           | £.3 | 6  | 0  |                          | £.15 | 0  | 0  |

Brought over £.3 6 0

Brought over £.15 0 0

## Second Year, WHEAT.

|                                                     |         |
|-----------------------------------------------------|---------|
| To leading the straw<br>and clearing the<br>stubble | £.0 5 0 |
| Ploughing and har-<br>rowing                        | 0 7 9   |
| Seed-wheat, three<br>bushels                        | 0 18 0  |
| Reaping and thrash-<br>ing, &c.                     | 0 18 0  |
| Rent and assessments                                | 1 10 0  |

£.3 18 6

## Third Year, PEAS.

|                                                          |        |
|----------------------------------------------------------|--------|
| Mowing stubble, lead-<br>ing, &c.                        | 0 5 0  |
| Preparing for peas,<br>as before described               | 0 10 0 |
| Four loads of ma-<br>nure and leading,<br>spreading, &c. | 2 0 0  |
| Peas for seed                                            | 1 0 0  |
| Managing in the<br>drills                                | 0 6 9  |
| Reaping and thrash-<br>ing                               | 0 6 0  |
| Rent and assessments                                     | 1 10 0 |

£5 17 9

## Fourth Year, BARLEY.

|                                            |        |
|--------------------------------------------|--------|
| Scarifying, plough-<br>ing, harrowing, &c. | 0 10 0 |
| Seed barley, four<br>bushels               | 0 12 6 |
| Mowing, leading,<br>thrashing, &c.         | 0 10 0 |
| Rent and assessments                       | 1 10 0 |
| Clover seed, 20 lb.                        | 0 13 4 |

£.3 15 10

By four quarters of  
wheat, at 2l. 8s. £.9 12 0

Straw 1 0 0

£.10 12 0

Four quarters of peas  
at 2l. per quarter 8 0 0

Straw 1 0 0

£.9 0 0

Four quarters of bar-  
ley, at 1l. 5s. per  
quarter 9 0 0

Straw 1 0 0

£.10 0 0

M 2

£.16 18 1

£.44 12 0

|                                                         |            |                                  |           |
|---------------------------------------------------------|------------|----------------------------------|-----------|
| Brought over                                            | £.16 18 1  | Brought over                     | £.44 12 0 |
| Fifth Year, CLOVER.                                     |            |                                  |           |
| To mowing, leading, &c.                                 | £.0 10 0   | By two tons of hay               | £.6 0 0   |
| Rent and assessments                                    | 1 10 0     | Herbage                          | 0 10 0    |
|                                                         | £.2 0 0    |                                  | £.6 10 0  |
| Sixth Year, WHEAT.                                      |            |                                  |           |
| Ploughing and harrowing                                 | 0 7 6      | Four quarters of wheat, at 2/ 8. |           |
| Three bushels of wheat, for seed                        | 0 18 0     | per quarter                      | 0 12 0    |
| Rent and assessments                                    | 1 10 0     | Straw                            | 1 0 0     |
| Harvesting, thrashing, &c.                              | 0 18 0     |                                  | £.10 12 0 |
|                                                         | £.3 13 6   |                                  |           |
| Seventh Year, TURNIPS.                                  |            |                                  |           |
| Mowing stubble, leading, &c.                            | 0 5 0      | Turnips                          | 3 10 0    |
| Preparing for turnips in drills                         | 0 17 6     |                                  |           |
| Six loads of manure, leading, &c. putting in the drills | 3 0 0      |                                  |           |
| Rent and assessments                                    | 1 10 0     |                                  |           |
| Cleaning the turnips, hoeing, &c.                       | 0 6 9      |                                  |           |
|                                                         | £.5 19 3   |                                  | £.3 10 0  |
|                                                         | £.28 10 10 |                                  | £.65 4 0  |

( 165 )

Brought over £. 28 10 10

Brought over £. 65 4 0

Eighth Year, BARLEY.

To ploughing, &c. £. 7 6  
Seed, four bushels 0 12 6  
Reaping, &c. 0 10 0  
Rent and assessments 1 10 0  
Seeds, one sack of  
rye-grass, ten lb.  
of trefoil, ten lb.  
of white-clover 1 7 6

£. 4 7 6

Balance £. 32 18 4  
38 5 8

£. 71 4 0

By four quarters of  
barley, at 1l. 5s.  
per quarter £. 5 0 0  
Straw 1 0 0

£. 6 0 0

£. 71 4 0

In the above calculation I have charged 1l. 10s. for rent and assessment. This is more than the cold clay soil about Grantham could at present pay. It is used to breed sheep upon, and cannot keep above a ewe an acre, with a lamb in summer. The whole profit arises from the lamb and wool, which does not exceed 1l. per acre, with an addition of 2s. 6d. per acre for the pasturing of a young beast in the summer.



## SECTION LXIX.

*A cheap and ready Method of rendering Land, which has had large Timber upon it, ready for the Plough—far preferable to grubbing or stubbing.*

TO make the land on which timber trees have stood ready for the plough, it has hitherto been the custom to dig the roots up; which by some is called stubbing or grubbing them. This practice can never answer, unless in such places where coals are so dear that labourers are willing to dig up roots for the sake of the fuel; and even in that case the taking out the root leaves a chasm in the ground, which requires filling up with soil, and then becomes a swamp for a considerable length of time.

There have been several machines invented for the purpose of drawing roots out of the ground whole. But such machines are

are liable to many objections; they are very expensive in the construction, troublesome to move and fix, and, on account of the great purchase required, are very subject to be broken. Besides, by tearing up a root, a machine makes a greater chasm than by digging it; and, as is very often the case, if any thriving timber stands near that which hath been felled, such timber runs the risk of being spoiled by the violence of the machine. I knew a gentleman who used to blow his roots to pieces in the ground with gun-powder; but he often missed his intention, as the powder frequently forced through some weak part in the explosion; and I never thought him a great gainer by the practice, though fuel is excessively dear in his neighbourhood.

My method is as follows: When the tree is felled, I leave a small quantity of timber in the seat or stool of the tree, and in that part make a fire with any kind of rubbish, and burn the stump in such a manner that you may take up the side fangs with little trouble or expence; so that a plough

may pass over the part. And when the harrows go over the place, they will intermix earth enough amongst the ashes to make that part capable of bearing crops. The roots will rot in a short time, so as not to cause a waste of land.

If roots lie in grass fields, pare some sods round the roots, and make a large fire of rubbish and sods. Ashes of sods retain heat much longer than those made from boughs of trees, &c.

## SECTION LXX.

*Necessary Precautions in the Treatment of Sheep to prevent the Rot, and pointing out the Cause of that fatal Disease.*

THERE are various opinions concerning the causes of the rot. It generally prevails much in very wet seasons: over-moist pastures will occasion it; and there is some land not so moist that will produce it;  
but

but I am fully convinced that there will be found swamps or wet holes in such land.

It is well known that sheep, by being moved to a market or fair, have caught the rot in one night. If the disease be not contagious, this must have arisen from feeding upon particular species of grass, infected with an egg on it or something of that kind; and I am inclined to think this to be the case from the following circumstances:—A farmer, in the neighbourhood of Wragby, in the county of Lincoln, took twenty shearling wethers to that fair, and left six sheep behind in their old pasture. The score of sheep sent to the fair were not sold, consequently were brought back, and returned into the field where the six had been left. Every one of the score which had been taken to the fair died of the rot within the course of the winter; but the six left behind all lived, and did well. There could have been no mistake with respect to this fact; as the sheep sent to the fair had been marked in a particular manner,

ner, and very differently from the remaining six.

Another similar instance corroborates the above opinion: A sheep being lamed in returning from Burgh fair, his remaining companions were suffered to range in the common until a cart was got to take him in: they all died rotten, and he remained perfectly sound.

I once had ten ewes sent me from Northumberland. After I had had them some weeks, one of them appeared to be drooping: it was immediately killed; and on examining the liver minutely, I observed a dark bloody spot with a hole, in which something seemed to be alive. The hole appeared as large as half a middling-sized walnut shell. I carefully cut off that part of the liver, and laid it on a board in a light place, and observed a number of small flowks hard at work. I then got a magnifying glass, by the help of which I could more plainly distinguish the little animals, which were frisking about like fish in a pool on a  
fine



fine summer's day. Some of them seemed feeding very heartily on the liver.

Soon afterwards I perceived the remaining nine ewes to be disordered, but not so much as to be entirely off their food. I killed another, and found the flowks had increased in size, and that they had penetrated much further into the liver. Some time afterwards, I killed another, and found the flowks to be still larger, and to have entered deeper into the liver. I thought it impossible to save any of them, being fully persuaded they would all die rotten.

I gave each of the surviving ewes two table-spoonfuls of spirit of turpentine. In the winter one died, two more were very badly choked, and very weak; two were indifferent, but little choked; and two of them ailed nothing to all appearance. All the six ewes brought up their lambs very well, and four of them were very fat in the summer: the two which had been so much choked were very good mutton: but, when killed, they all had flowks; and the  
two

two which were so much choked had by far the greatest number.

The flowks prey so much on the substance of the liver, and introduce themselves so deeply into the numerous blood-vessels of it, as to change the colour of the blood, and reduce almost the whole of it to a thin watery serum; depriving the animal of the principal support of life, and destroying that source of nourishment so absolutely necessary to be distributed pure through the whole system. Blood in the soundest state is supposed to contain five parts in six of water; and when these ravenous flowks have fed for a length of time on the most solid part, as sheep must hold down their heads to feed, the watery serum settles underneath the chaps, and forms what we call a choker.

When the flowks have been some time in the liver, and have become large, they will form cells for themselves, around which the parts will be hard or callous; and the whole liver will become a concretion of knots and lumps. When you kill a sheep

of

of this kind, the liver will appear like a lump of congealed blood, the blood-vessels will be found to be inhabited by a numerous family, the flowk will be large and lively; and in the dwellings they have formed for themselves you will discover a yellow matter, which I take to be their excrement.

Notwithstanding the loss of blood which sheep troubled with this disorder must certainly suffer, I have known many, that, after being much reduced in flesh, have got through the winter, fed very well in the spring, and lived many years.

In the rot, as in every other disease, there will be a greater chance of obtaining a cure, if you attack it in time, and endeavour to stop its progress. Therefore, when, either from the extraordinary wetness of the season, or from any other cause, a suspicion arises that your sheep are infected, you will do well to examine them with the greatest care; and by the following signs you may decide to a certainty whether they are diseased. Look under the upper eyelid; and  
if

if the part appears white, and the veins seem to have little or no blood in them, you may rest assured they are affected, and that the sheep has the rot, and will from thenceforth decrease in value.

If you kill a sheep and boil the liver, and it dissolve and boil away, it is a certain sign of the disorder having taken place; and the sooner you dispose of the sheep the better.

People in general are prejudiced against mutton, if they suppose the sheep to have had but a touch of the rot; and the Jews are more scrupulous by far in this respect than Christians: but I do not think the flesh unwholesome. It has indeed less gravy, and is of a whiter colour than sound mutton, which is owing no doubt to the loss of blood; for, in order to render veal white and dry, we bleed the calf frequently.

A sheep, though infected with the rot, may be fat: but both flesh and fat will weigh less in proportion to the bulk.

This disease is not so easily cured as prevented: I think the prevention very easy.

Were

Were lands properly drained, they would very seldom rot sheep; for though water of itself will not rot sheep, yet over-moist land breeds something that will. On dry healthy land sheep are rarely troubled with the rot. In salt-marshes, though abounding in moisture, this disease is not to be found. On clayey soil, which will retain rain a considerable time after it falls, the sheep are very subject to the rot; for the animalcules we call flowks are most probably generated in the little stagnated pools of water, are swallowed in embryo by the sheep, and get nourishment by feeding on their liver.

In wet seasons, to guard against the rot, let there be plenty of grass in your pastures, and suffer no horses to feed among the sheep.

Sheep never contract the rot in frosty weather. If the rot were owing only to wet, it would attack sheep more frequently in winter than summer: but they never contract it after the frost sets in. It generally makes its appearance about the latter end of June.

There



There have been instances of the rot taking sheep at Christmas: but it has been in a season remarkably open and wet. Most open commons will rot sheep: they have destroyed thousands; whereas, had they been enclosed and cultivated, they would have been of public advantage.

## SECTION LXXI.

*An effectual Remedy for Cattle staling Blood; with several Remedies for other Disorders to which they are liable.*

**STALING** of blood, or, as some term it, the *bad-water*, frequently proceeds from a change of pasture. The land it prevails upon is generally of a poor nature, and such as produces whins. The disorder commonly makes its appearance in spring.

Before I took upon me to doctor my own beasts, I have known several die with this disorder. When a beast was taken ill; my custom was immediately to send away for

for a farrier called a cow-doctor; and I thought it my duty so to do. But a worthy old gentleman, a physician who attended my family, soon convinced me of the ignorance of the class of men called cow-doctors, and the very improper treatment they prescribed for their mute patients.

There are some, who from their education and profession give us to hope a little more science than is to be expected from the mere cow-doctors, but who are not a jot behind them sometimes in negligence and ignorance.

The method I here prescribe I have used for some years, and have never known it fail of curing the disorder. My first trial was upon a valuable cow, whom two farriers had practised upon without success. She was so bad as not to be able to rise without help. I took a large handful of nettles, which were boiled gently in two quarts of water until the liquor was diminished one half by evaporation. As soon as this liquor was sufficiently cool, I gave it to the cow, and immediately after washed it down with

a quart of chamber-ley in which a handfol of common salt had been mixed. This medicine operated so as to change the colour of the water in about three hours: the cow had a free passage; which is the principal thing to be obtained. I am convinced many die for want of it. In less than a week she was perfectly cured.

This remedy, the reader will own, is very simple; and I can assure him I have never yet known it to fail. Salt dissolved in warm water, and given to the animal, will soon purge gently: but if the case should prove obstinate, it will be proper to give a clyster with plenty of salt in it, which will soften and quickly bring away the indurated fæces. Some farriers are very fond of prescribing castor oil for this distemper, but I never found it answer so well as my remedy.

There is another disorder to which cattle are subject, called the *tail-worm*, and numbers die of it. When a beast is attacked by this disorder, he finds great difficulty in rising from the ground; and if the disorder is neglected until it becomes violent, he is  
unable

unable to rise at all when once down. Some attribute this disease to the beast having been stricken by lightning, or think the beast has broken his back. Both fat and lean beasts are liable to this disorder, and the fat beast is not perceived to decrease much in flesh until the disorder is so increased as to prevent him from rising; and in some cases, where the progression of the disease is slow, it will be a long time before that happens. A careful man will easily discover by these symptoms when a beast is attacked by the disorder: he will make frequent attempts to rise, and appear in pain; he will drop down behind, before he is half risen. You must then examine his tail near the tip or bottom, and by pinching or holding it up you will find the bone entirely wasted; which so much affects the spine of the back-bone, and causes such a weakness in it, as to prevent the animal from rising.

If you apply a remedy in time, the disorder is easily and certainly cured. My method is to amputate about two or three inches of the tail, according to the stage of the disorder.

der. You will find the bone, as the farriers, who have no knowledge of the cause of this disorder, express it, "eaten in two," that is, entirely decayed: and this they tell you has been occasioned by a worm feeding upon the bone. But amongst the great number of tails I have cut, I never yet, after the most diligent search, could discover one of the worms they talk so much of. It would be more just, in my opinion, to attribute this disorder to a caries of the internal part of the bone. Amputation is the readiest, safest, and surest cure. No internal medicine is necessary. You need only be cautious that the tail is cut off a little higher than the diseased part, and you will soon find your beast recover. I have known a beast, which for several days had been unable to get up, rise in two days after having part of its tail cut off, and thrive.

Some farriers will cut open the tail, and apply salt and onion to bring about a cure. I have heard of beasts hung up in slings, and stuffed with drinks day after day, until they have died. The ingenious farrier will  
tell



tell you it is the *pif* or pith of the back that is affected; but I say the caries begins near the extremity of the tail. Take away the cause, the effect will cease. I am, like Doctor Laet, for a radical cure, which is undoubtedly best effected by lopping off the rotten part.

Another disorder very common amongst beasts is the *foul in the foot*. This is very painful, and of course injurious to the feeding beast; for neither man nor beast thrives much whilst suffering great pain. It is most commonly the effect of cold, and shews itself first in a tumour, or swelling betwixt the claws of the hoof, which is very much inflamed. A poultice would doubtless be a good remedy; but it is impossible to apply it properly. Sometimes the swellings are hard or scirrhus. In the first instance the cure is easily perfected; in the second, it is more difficult to be accomplished; but nine times out of ten this disorder would pass off with the same remedy as is found so useful when the gout attacks the human frame, I mean patience, which, when

the beast is in question, must be practised by the patient's owner.

Those who have faith in charms follow the beast along the pasture, observe where he treads, then cut up the sod, and either turn the sward side downwards, or hang it on a hedge; and the owner waits with patience for the cure of his beast.

Some apply tar and quicklime to hasten the suppuration of the tumour, which they rub round with a hair rope to promote the discharge with expedition. The best method of treating this disorder is, if the tumour becomes ripe, to open it with a sharp-pointed penknife, to cleanse the wound thoroughly, give it a common dressing, and let it heal gradually. But that operation is seldom necessary.

The *gargle* in a cow's udder is a disorder frequently met with, and arises from a conjection of milk in the udder: but an observing hind or dairy-maid will, by taking proper measures in time, prevent this disorder from being attended with bad consequences. The first signs of it are, one or more of the

paps and part of the udder appearing unnaturally distended, and violently red or inflamed. It is then necessary to draw] all the milk out of the bag, and to rub the part with marsh-mallows ointment twice a-day. But if the disorder has been neglected until the milk has become much inspissated or fettered, you must anoint your hand plentifully with hogs-lard, goose-grease, or linseed-oil, and rub or chafe the pap and every part of the udder inflamed. Some boil the leaves of elder in milk to a pulp, and make an ointment by the addition of hogs-lard, with which they anoint the parts, rubbing it well in. House-leek and white-lily root are very good; but any thing which softens the part will answer the purpose. The chafing and rubbing alone is in most cases sufficient, if you take care to draw the milk regularly morning and evening.

Farriers or cow-doctors in this disorder generally prescribe physic for the cow to keep her body cool; and if the milk has much of a mucous thickness in it, gentle purging may not be unnecessary. But

warm fomentations, or the application of the ointment with the friction or long rubbing with the hand, will be found the most certain cure. This gargle disorder chiefly attacks cows: but I have likewise known an ox gargled.

### SECTION LXXIII.

#### *Several approved Remedies for the Cure of Disorders in Horses.*

THE horse is subject to almost as great a variety of diseases as mankind; and amongst the most painful common to both may be reckoned the colic, or as some term it the cholic, and others the gripes. This is not only a painful, but is often a very fatal disorder to horses. There are many causes to which it may owe its origin: but the most frequent is the retention and induration of the fæces in the large intestines, and sometimes in the small ones. Sometimes it proceeds from the horse, when heat-

ed by exercise, drinking too freely of hard water. The most approved remedy in both cases, is a good dose of gin the moment any symptoms of the disorder appear. I have given a pint of gin at a draught; and in a few minutes afterwards have repeated the same dose. When the horse has been very ill, I have given a whole quart, in which I have infused an ounce of pepper. It is likewise proper to rake the horse, which is done by anointing the hand with hogs-lard or oil, thrusting it into the fundament of the horse, and raking out all the dung you can get at. Repeat this operation, and every time take care to anoint your hand as before, after which give the horse a clyster of the emollient kind. This method has succeeded in most instances.

I had a strong mare of the draught kind, which had rather too much spirit. She was much subject to the colic; for she was so fond of her work, and so violent, that she would not stop to dung; by which means the fæces were too long retained, and by pressing on the neck of the bladder caused a  
difficulty



difficulty of staling. I used to cure her by raking and clysters; though at times she was exceeding bad. Opening a vein is frequently of service in the colic.

Mares casting their foals is another common accident; which is prevented by taking some pigeons' feathers, and laying them on a pan of hot coals, so that they may smoke but not blaze, and holding these smoking feathers under the mare's nostrils for eight or ten minutes. I never knew this fail. Before I made use of pigeons' feathers, I had six mares in one stable, all with foal: four of them, one after another, cast their foals; though, when the accident had happened to the first mare, every method then in use was put in practice, such as burning pitch and tar in the stable, and continued until three more cast their foals. The two remaining mares were smoked with pigeons' feathers as described, and they brought their foals, and did very well. This as a preventative should be applied at the latter end of the year. I generally do it twice, the beginning of October and the beginning

beginning of November. I never knew a mare cast her foal when this preventative was used. At the time the mare is about to cast her foal, take the craw of a fowl, and cram it down her throat, and it will prevent the abortion.

Greasy heels is another disorder to which horses are very liable: but it is a disorder that scarcely ever is to be found but when brought on by neglect of the person who has the care of them. So long as the horse runs in the field without being used, he will not have greasy heels. This disorder is frequently brought on by giving the horse too much work and too little corn, and likewise neglecting to give him proper cleaning. By being over-worked and not kept in heart by a sufficient quantity of hard meat, the horse is reduced in flesh, his blood becomes weak and fizy, and abounds with a thin watery serum, which falls into his legs. In consequence of the legs swelling, the skin becomes distended, and is exceedingly painful; the pain prevents the horse from lying down; the swelling of course increases, until it breaks forth

forth in filthy ulcers, whence issues a putrid or stinking matter. I know, indeed, that some horses which run in stage-coaches and are high fed with corn, will have swelled heels; but that mostly is a different disorder from what is called a greasy heel, and generally proceeds from the alternate extremes of heat and cold, which engender humours and corrupt the mass of the blood. However, in either of these cases, the first step necessary is to procure a free discharge of the eroding matter; for, if it is suffered to stagnate till it becomes acrid, and is absorbed into the blood, the cure becomes extremely difficult, if not impossible. A very small portion so absorbed will raise a putrid fever in the horse, as surely as yeast would cause a fermentation in a tub of wort.

If this disorder is recent, the cure is easy; for, supposing the heels only cracked and but little swelled, it is sufficient to wash them with soft soap and warm water, and give him gentle exercise, and plenty of corn and malt mashes; and if any fungous or proud flesh is formed, you may apply a little verdigris

degris mixed with honey; or, what will answer the purpose with much less trouble to yourself, get some blue vitriol, pound it fine, and put it on the part.

It is always to be remembered that cleanliness and care will promote a speedy cure: therefore let the horse's heels be rubbed out with warm water and soft soap; and let not the groom or horse-keeper be afraid of dedicating a couple of hours labour to pressing and rubbing the legs and heels of the horse; for by such friction he will promote the circulation of the blood and juices, and gain honour to himself by the fineness of his horse's legs. During the course of this cure, it will be necessary, if you want your horse for immediate use, to give him plenty of corn. I recommend four feeds of good oats, making one peck—or more if you choose, it will not injure the horse—not forgetting to mix a quantity of chopped straw with each feed, as heretofore recommended. This will cleanse his bowels, as brushing does his skin, and answer much better than physic. If you do not want your horse for use, let  
your

your man ride him out gently, morning and evening, upon some field or common, where he will not be subject to pick up much sharp sand or dirt; taking care not to wash his legs with any thing greasy, as the dust will stick to it. Let him be walked only for an hour each time. Flesh will soon grow, and the grease will soon leave him.

But if this disorder has by neglect been suffered to get to a considerable height, it would be highly dangerous to dry the sores up at once. In this case we must promote suppuration by every means in our power, and endeavour to give a discharge to the virulent matter. After having first had the heels well washed with soft soap and water, apply a poultice of roasted turnips. When you find the discharge has been sufficient, and the pus or matter which has been brought away to be of a mild sort, you may leave off the poultice, and, keeping the wounds perfectly clean, proceed to dry them up: and during the cure it will be proper to give the horse hot mashees of bran with nitre mixed, to give him warm water, moderate



derate exercise, clean stable and straw, and good dressing by a diligent and active groom. This disorder I have already said is brought on by the negligence of him who has the care of the horse. I would therefore advise the master, upon the first appearance of the swelling, to see him eat his corn, to see him well dressed, his legs rubbed with straw and with the hands, after being clean washed with soft soap and water. The master must likewise take care that the horse has his necessary exercise, and that his straw and his stable be perfectly clean and comfortable; and the horse will not want a doctor.

Horses that have fed upon low land are liable to the grease; and such feeding will also cause a disorder which is called the fel-trick; which is a tumour or swelling in the lowest part of the abdomen or belly, and which, if you open it by making a small incision in the skin, you will find to be full of a white watery matter. A horse worth preserving ought never to be put upon such land; for if he escapes with life he is certain of injuring his constitution, and of be-  
ing

ing rendered unfit for hard exercise. I would not buy, at any price, a horse that had been bred in the fens, or kept on low fenny or swampy land, let his figure be ever so good. What I call marsh land is of a different nature from fenny land; especially salt-marsh, which is by far the best pasture a horse can go upon in summer. The feltrick is cured by fomenting the part to ripen the tumour, by rowelling, and by plenty of good corn.

The canker in the horse begins in his mouth. I have known it increase to that degree as to eat the tongue completely through. The only way of curing a canker is to destroy it at its first appearance. It may be known by the horse chewing his food, and letting it drop out of his mouth again, and shewing a difficulty in swallowing. To cure it, mix bole armenic with some of the sharpest white wine vinegar or alegar, add a little honey, and mix the whole up to the consistence of cream. Take a stick, tie some tow round one end of it, and rub the part affected, which at that time will not perhaps be  
bigger

bigger than a pea : but you may rub all over the mouth by way of prevention. If you are early in this application, you will dispel the tumour, and cure your horse : but if you delay till it breaks forth all over his gums and tongue, it will require longer time to work a cure. The same application will cure the canker in any other part.

For bruises, crushes, or contusions—I mean to speak of simple contusions only ; for where they are compound, that is, when the internal or bony parts are injured, better advice and assistance than I am able to give will be required. In fact, compound contusions are for the most part of such a nature, that a horse is seldom good for much after he is supposed to be cured.

Fomentations or embrocations will cure contusions, and dispel tumours which arise in consequence. There are a variety of ingredients that people use in fomentations and embrocations, which tend to the same end, and mostly have the same effect. I make use of the following, which I have found to answer : Take a quantity of stale

urine (if you have a tub in some convenient place to keep urine constantly by you, it will be found often useful), and, if in summer time, put some elder leaves in it; if in winter, the bark of the elder, ground-ivy leaves, groundsel, or house-leek. Chop them fine, and put them in an iron pot, and let the mixture gently stew for a sufficient time to extract the juices from the herbs. Then add as much cow-dung as will stiffen the mixture sufficiently to make it stick upon the part when you apply it. The best way of using this, is to get a stick (an old broom-stick is as good as any thing), split it at one end about six inches down, and in the cleft part slip in a piece of an old stocking, and tie it on tight: make the mixture boil (for which purpose you had better have a pan of coals in the stable); dip the stocking into it, and foment the diseased part by dabbing on the place. The oftener this is repeated, the better. You need not be afraid of applying this fomentation too hot, or repeating it too often.

By persisting in fomenting the part, you will

will have symptoms of an approaching cure; between the fomentations a kind of dew will rise on the hair—an indication of perspiration, and of the speedy termination of the disorder. You will be cautious not to neglect repeating the fomentation very frequently; and you must keep the horse well covered, particularly on the part affected, so that it be kept as warm as possible; for warmth will greatly assist the dispersion of the tumour, and prevent the stagnation of the blood. By immediately having recourse to the remedy recommended above, you may often cure a simple contusion within twenty-four hours.

If the contusion is large, and an abscess is formed, it will be necessary to promote suppuration as speedily as possible; and if the fomentation mentioned is not sufficient to ripen the part, you may have recourse to a poultice, if the contusion is seated in a part on which you can easily bind it. The poultice may be put on in the night, and may be made of ale-grounds or stale beer, with wheat-bran and cow-dung. In general,



however, the tumour will yield to the fomentation recommended above. If it break, and a white thick pus runs from the orifice, you must press the matter gently out with your hands, and clean the wound thoroughly with a bit of soft sponge. In all wounds, great care should be taken to prevent fresh blood from rising; as the air affects the part and retards the cure. Some will content themselves with fomenting a bruise or contusion twice or thrice in the space of twenty-four hours: but by such trifling you will neither dispel it, nor, if a dangerous one, bring it to a speedy suppuration. You may in fact by such means do more harm than good. I have seen some extraordinary cures by the above method; and when the horse has been in extreme danger I have caused him to be attended night and day.

Rowelling is sometimes very necessary to assist in discharging the foul humours, and prevent them overloading the part agrieved. Rowelling in unskilful hands is a dangerous operation. I knew a bungling fellow, who, determining to go deep enough,

cut

cut through the muscles of the abdomen, and wounded the peritonæum or thin membrane, which covers the omentum or cawl : the horse, which was a valuable one, died in consequence. The way to rowel a horse is to make a small incision or slit just through the skin, about three or four inches above the part aggrieved; put in your finger, and work it round until you make room sufficient between the flesh and the skin to contain the leather rowel, which must be prepared in the manner following: Take a piece of thick tanned leather, such as is used for soleing of shoes; cut it round, about two inches diameter; make a hole in the middle, lap it with tow so as to cover the leather well, and dip it in spirit of turpentine. After you have introduced the rowel, stop up the hole in the skin with tow, dipped likewise in spirit of turpentine. It is adviseable to tie a piece of string, which you pass through the hole in the leather, so that you may draw the rowel out at pleasure; and it may be likewise necessary to tie a piece of strong packthread round the lea-

ther part of the rowel, to pull it out with more certainty and ease, as the leather will swell much, and the orifice sometimes becomes small, and the edges get thick. There are several preparations which were used to dip the rowels in, such as salt of lemon, &c.: but I never found any thing better for the purpose than spirit of turpentine; for that, in my opinion, will promote suppuration the soonest. If the above instructions be attended to, there is no danger in rowelling; but it will be necessary to keep the horse warm, to give him mashes and plenty of corn, and his water warm. Nor must he be permitted to go into the cold air until the rowel begins to discharge: but when it discharges a thick kind matter, the horse may be worked gently without fear of injuring him. However, great care must be taken that the animal get not wet by rain or any accident, lest it occasion a cold.

In strains of all kinds a horse will be the better for moderate exercise; for, if the pain is violent, he will stand so much in one posture as to run the hazard of contracting his

finews in such a manner as never to have the proper use of them afterwards. If the strain happen in a part that can be poulticed, I am for applying one, though not the fashion at present amongst farriers or horse-surgeons: but I know it to be proper, after bathing the part affected with brandy and vinegar two or three hours, especially when an inflammation takes place: and yet I have seen farriers apply strong oils; which is adding fuel to fire: and I am convinced, that, were you to apply the same pretended remedies to a horse perfectly sound, you would make him lame. The common method of treatment may answer the purpose of putting money into the farrier's pocket, as a lame horse is more profitable to him than a sound one; for he is paid his journey, plaster, bottle, &c. &c. I am for giving nature every chance of working for herself: but I think many of the medicines and applications which are used counteract nature when she is disposed to bring on a favourable crisis.

The proprietors of stage coaches, ma-

chines, &c. have occasion for good horses; but they sometimes buy such as are lame from some old sore or accident: and I have known it happen, that a horse who has been strained, and sold for a mere trifle, has run himself sound in continually working the stage. I do not, however, recommend such violent labour for the cure of a strained horse; though, to give such the moderate exercise of the plough and harrow, is, in my opinion, more likely to effect a cure than all the internal medicines or external applications in use amongst farriers.

Warbles are troublesome sometimes on a horse's back under the saddle, and the sooner they are dispersed the better. If the part is much inflamed, and feels hot to the hand, take oil of vitriol, with an equal portion of hogs-lard; simmer it over the fire for some time till it becomes an ointment, with which, when cold, rub the warble. You may safely use the horse if you want him immediately. I never knew this fail effecting a cure.

For heat-blains under the saddle, apply  
falt



salt and water, as soon as you come in from riding your horse, and that will prevent them rising.

## SECTION LXXIV.

### *Cow-Grass; Culture and Use.*

COW-GRASS is a sort of clover, and so like red clover as not to be easily distinguishable when not carefully compared. The seeds of both are much alike, but there is a great difference in respect to the quality of the grasses. I have seen a much greater crop of cow-grass on the same sort of land, and in the same season, than I ever did of red-clover. Cow-grass will grow to very great length, and delights in a clayey soil. I have seen it rise six feet high amongst thorns, and whins or goss.

I do not think cow-grass of a very feeding nature. It is a later plant than red-clover, and sheep do not like it so well. I have

have seen one side of a field sown with cow-grass, the other with clover: the sheep ate the clover very bare, but left the cow-grass, as if they disliked the pasture:—at least, they certainly preferred the clover. The culture of cow-grass is the same as of red-clover.

## SECTION LXXV.

*Remarks on the Management of the Kitchen Garden. Advantage of the Plough in respect to Peas and Beans of all Sorts, Spinach, Cabbages, Carrots, Onions, Parsnips, &c.*

BY the method I propose, an acre or any given quantity of land will produce in a more abundant manner any of the kitchen-garden vegetables, roots or plants; they will sooner arrive at maturity, and be in every respect better in quality than by the customary method of gardening.

For trial, take an acre for peas. We will suppose

suppose the land to be in good condition, and to require only once ploughing, or once digging. The ploughing will cost per acre 5s.; the harrowing, 1s. 6d.; drilling, 2s. 6d.; sowing the peas, 4d. per acre; and the harrowing-in, 1s. 6d. It will be necessary to mould three times with the plough; twice, to kill the small weeds; and once, to mould up the peas. The moulding to kill the weeds and afford a little earth, each time 1s. The third and last time of moulding we will estimate at 2s. per acre. These different sums put together will make the expence to be 14s. 10d. per acre. Now in the common way the least cost is per acre, digging, 2l. 2s.; setting, 1l. 1s.; hoeing to kill the weeds, 4s.; moulding, 4s. if not 5s.; which will be 3l. 11s. or 3l. 12s. per acre. The gardener attached to the old practice, will say, his method will produce better crops. The following is a proof of the superiority of mine: I had on the 25th day of May 1797 an acre and a half of peas in full bloom on my farm at Sprodborough, which for that situation was a novelty: they grew  
on

on an acre and a half of old going land, which was treated in the following manner: In the year 1794, potatoes; 1795, wheat; 1796, oats; 1797, peas; and manured with a compost as before described, in a cheap manner, not exceeding 2s. 6d. per load. Eight loads was the quantity laid on per acre; so that the whole of the land cost but thirty shillings for the dressing. By the 10th of June they were fit to pull green for market, and they were universally allowed to be as abundant, and as fine a crop in every respect as had ever been seen on so small a spot. If so good a crop can be procured from old going land in a farm, surely there can be little doubt of succeeding with the plough where land is enriched to gardening condition. The difference in expence is well worth attending to.

The old method, we say, will

|                |     |    |    |
|----------------|-----|----|----|
| cost per acre  | £.3 | 12 | 0  |
| The new method | 0   | 14 | 10 |

---

|                          |     |    |   |
|--------------------------|-----|----|---|
| Saving by the new method | £.2 | 17 | 2 |
|                          |     |    | 1 |

I take the price of land, seeds, &c. to be the same in both cases: here, then, is a net profit of 2*l.* 17*s.* 2*d.* per acre, no despicable thing. But there are other considerations independent of the first profit, which render my method still more preferable to the old one. By the old method you must of necessity employ a number of labourers; a circumstance always attended with trouble; for, unless the master follows them diligently, and watches them narrowly, he will often pay full price for having his work half done; and the vexation a good farmer must undergo from the frequent refractory behaviour of labourers certainly deserves a place in the account. I had rather manage ten acres of land with horses, and direct them myself, than three acres with men, and have the plague of following and watching them in the old method. My fatigue, I am sure, would be much less with the dumb animals, even if we join asses to the number. Supposing I had determined to cultivate the ten acres myself, there will be ten days ploughing—drilling, five days—sowing,  
one



one day—ploughing to kill weeds, three hours twice, and six hours the third and last time: this is exactly what my men do at present for me. We will call it eighteen days' work, and suppose the crop peas; but other garden-vegetables may be raised at the like expence, or cheaper: the land may be ploughed by horses, and harrowed by them, but not drilled; for we will have a small plough for this purpose which shall be drawn by an ass, which will answer for spinach, carrots, garden-turnips, &c.: as the drills ought to be only twelve inches asunder, a horse could not pass between the rows. The same plough with the ass may clean between the rows; for the plough and ass being the exact measure of the furrow, will clean the land they have made themselves, in a perfect manner; and the drills will be a proper space to walk in.

I attended my men to set with potatoes an acre of land where garden-beans were growing, and half an acre of them were formed for blossom, and the rest sufficiently advanced to bear moulding high in the rows. This was performed

performed a few minutes within three hours in the following manner: Six children to drop the potatoes before the plough. One man to mind they dropped them regularly about eight inches asunder, as also to serve the children sufficiently with potatoes to fill their baskets. One man to attend the horse in the plough. The expence was,

|                                           |          |
|-------------------------------------------|----------|
| Six children, at 6 <i>d.</i> per day each | £.0 3 0  |
| Two men, at 2 <i>s.</i> ditto ditto       | 0 4 0    |
| Horse, at 3 <i>s.</i> ditto               | 0 3 0    |
|                                           | <hr/>    |
|                                           | £.0 10 0 |

Now, allowing nine hours to a day's work, and the total expence ten shillings, there will be three hours which the potatoes took in planting to be placed to that account, which will be a deduction of 3*s.* 4*d.* from the beans, leaving the net charge upon that article per acre just as much as an honest attorney would charge a simple countryman for asking him a question, viz. 6*s.* 8*d.*

It may perhaps be objected, that this  
scheme

scheme would deprive a number of poor people who now work in the gardens of a livelihood ; for, by adopting the method, those of affluent fortunes would not have occasion to employ such a number of women in summer as weeders, nor so many men in winter as labourers. But remove the man with his wife and children into the field, and make a garden of that ; then the man with half a dozen children, instead of being poor, will soon find himself at ease.

I have raised not only a double crop of potatoes and beans, but likewise a double crop of potatoes and cabbages, by the plough, with a little assistance from the spade. As the manure lies between cabbage and cabbage, it would indeed be impossible to put the potatoe in a proper place without the spade ; and as there will always be some runners in cabbages, this method fills up the vacancy in a proper manner, and is highly profitable. I began cutting the cabbages in May ; they were all cut by the time the potatoes were fit to earth. The expence of setting an acre of potatoes amongst cabbages

atoes is 7s. per acre. A man, his wife, with a boy or girl, will set one day with another better than half an acre. The man digs the hole, the child drops in the potatoe, the wife with a hoe covers it with earth, and at the same time cuts up any weeds that may be growing between the plants. The expence will be for half an acre :

The man one day, at 2s.      £.0 2 0

The woman one ditto, at 1s.      0 1 0

The child, one ditto, at 6d.      0 0 6

£.0 3 6

Which will be equal to 7s. per acre.

Carrots should be sown in drills : but you must reverse the method prescribed for turnips. Make the land ready with the plough, then level the ridges with a rake, and with a hoe make two drills, one on each side the ridge. In these drills sow the carrot-seed, and rake the mould over it. Thus you have double soil, which will

greatly add to the size and length of the carrots. Between each row of carrots you may on the top of the ridge sow radishes or lettuces. When the carrots come up, you may with great ease hoe them: that done, betwixt each row you may plant the Savoy cabbage, or dwarf kidney beans. I am of opinion you will have greater weight of carrots than if the land were all sown with them broad-cast. The cabbages or kidney beans will not at all injure the carrots, nor the carrots the other crops: and as the land will be prepared by the cleaning of the carrots, there will be no other expence but that of the seed or the plants. Another advantage attending sowing the carrots as above, is, that instead of digging them up, in the expensive mode at present practised, with spades or forks, you may plough the earth from them with the Rotheram plough, when they may without difficulty be pulled up, even by children.

Cucumbers, parsnips, &c. may be raised in the same way as above directed for the carrots.

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## SECTION LXXVI.

*Observations on Buck-Wheat.*

BUCK-WHEAT in this country is mostly used as a green crop. Some sow it for the exprefs purpose of ploughing-in for manure; but fuch practice is bad husbandry, and I difapprove of it much in any green crop; for, if a farmer has money, he muft be an indifferent judge indeed of ftock, if he cannot depafture it with fome cattle, that will pay better, and produce both more and better manure than ploughing-in the green crop. Therefore, I recommend buck-wheat, except fuch as may be wanted for feed, to be eaten green in the fold. It will as a green crop bear fowing later, and grow much quicker than any other fort of plant for fodder, and by its quick growth fmothers all weeds. It may be fown after a crop of rye and tares, that have been fown

in the autumn, are eaten off; and the land will be greatly ameliorated, and ready for wheat in the proper time again. The buck-wheat may be sown after a spring depasturing on two years old feeds.

To those gentlemen who have extensive manors, and are desirous of preserving the game, but particularly pheasants, buck-wheat will be found advantageous; for there is no grain whatever that pheasants are fonder of. They will fly many miles from home to feed upon it.

Buck-wheat will grow on any soil, and succeed on a poor sand and on a rich loam. On land nearly barren this grain may be sown to advantage. The time of sowing is from the beginning to nearly the end of June. Some foul land requires ploughing before winter, and treating as directed for the pea-fallow. If subject to lie wet, grip and drain well; and clear the land of weeds by carting them to your reservoir. Another ploughing and harrowing may be necessary before the sowing in June. In August, when grass fit for mowing is generally

nerally scarce, this crop, if eaten green, will afford excellent fodder for summer-folding of cattle. The quantity of seed required to be sown is from two to three bushels per acre. The grain, when ripe, is good food for pigs, turkeys, and other kinds of poultry; but I hope never to see my countrymen reduced to the situation of the peasants in Germany, who use it as a substitute for wheat.

Buck-wheat particularly suits blowing sand, or any light soil; as it grows quicker, and produces a greater abundance of food for cattle than any other plant sown so late in an equal time could.

## SECTION LXXVII.

*Observations on Rye, for Spring-eating by Cattle.*

RYE is very beneficial, when sown amongst tares in the autumn; as a proper quantity will shelter the tares and draw them up. Rye is a hardy plant on land that suits it; and it will grow to a great length on such land in less time in the spring than any thing I know of. Rye answers the same purpose for tares as sticks or rods do for peas; and they may be eaten well together. It is likewise good where land is in condition and clean for spring-eating for sheep, and to sow turnips after. I recommend to sow the rye and tares by the drill, for both forwarding the crop and cleaning the land.

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## SECTION LXXVIII.

*Method of setting Quick-Hedges, and of  
plashing them.*

THE best method of planting quick-hedges upon swarth land is under the cape sod, which is done by lining out the intended ditch, and on the side you intend the quick to be planted let your bank be made. Therefore first with your spade set out your ditch, then lay down your quick upon the sward you intend to cover; take the first sod and turn it over out of the part you intend for the ditch upon the quick, so that the quick root will lie between two swards, and be prevented from striking downwards; and if there be any good soil, the root receives the benefit of it, and will enjoy that moisture it stands so much in need of from the ditch. Set the next sod bank-wise, and another row of thorns, if two rows be required;



quired; and continue the bank in the same manner until the work is completed: this is not only the best, but it is the cheapest method in the first instance; it is likewise the least expensive to clean.

Sheep and lambs are destructive animals to quick; but if by accident they get into the ditch, they cannot so easily injure it as if it stood elevated on a bank between two. In some counties the common practice is to set quick on a narrow ridge or bank with a ditch on each side, by which means the best earth lies at the bottom, and the poor stony soil at top. In such a situation it is wonderful to me that it grows at all: it is indeed hardly possible to take more effectual means of preventing the growth, unless they cut off the root. We must all know that the quick-thorn, like other plants, will vegetate best in such soil as is most congenial to it; and we know quick delights in a good surface soil properly pulverised and manured, and that it is necessary it should be constantly weeded and cut down within an inch of the ground the February following your planting

planting it, if you mean it to thrive. But, because the weeding and taking care of the plants when young is attended with trouble and expence in the outset, some content themselves in general with simply planting the quick, and leaving it the chance of thriving in bad company, without considering that the old adage of "the first cost being best," can never be better applied than in this instance; for the quick being properly nurtured and trained in infancy, will at a maturer age arrive at a perfect handsome hedge, and not only serve the purpose of a good fence, but, well managed, may pay the farmer for the trouble bestowed upon it.

I see no reason why a hedge should not pay interest for money laid out, as well as any other part of a farm. Suppose for instance, in valleys or such situations where the land is good, plum-trees, apples, cherries or other fruits of the choicest sorts were planted at intervals, instead of suffering the wild and almost useless sort to grow; the expence would be trifling at first, the fences  
soon

soon become a very valuable part of the farm, and add not a little to the ornamenting it. If I had land to inclose, where I intended to plough continually, I would set the fences with the filberd or with the common wood-nut, which would produce a profitable crop of nuts.

In quick-setting the distance must be regulated by situation. If upon ploughed land, one in a foot is sufficient, if you could insure the growing of them all ; but at six inches apart is the safer way, and this is my constant practice.

As to plashing of hedges, Hertfordshire has generally been esteemed the county of all the kingdom where this work is best understood, and where it is performed in the neatest manner. But in that county it is usual for gentlemen to have a covenant inserted in the leases they grant, to restrict the farmers from cutting and plashing the hedges more than once in the space of ten years. The best method of plashing, in my opinion, is, to cut them much earlier, as, when young, the branches shoot more vigorously,

gorously, and a young thorn cut off will grow with more luxuriance than from the first planting. You will do well to assist the shoot by adding a little fresh earth to the bottom of the quick, as that will not only cause the quick to grow better, but will likewise snub or check the grass roots, and prevent the weeds from getting up and injuring the growth of the hedge. If the ditch be dressed out, it will add to the goodness of the fence; and should the ditch be wanted for a drain, it will pay well for the expence.

The first thing necessary towards plashing a hedge is to furnish yourself with a good hedging-bill, which an expert workman will always keep in the highest order; for the neatness of the hedge depends in a great measure on the sharpness of the tool. Cut down the old stubs within two or three inches of the ground, or so low as that the next time the hedge is plashed the dressing up the ditch may cover the stump, and that the part laid down, which is called the layer, should have as little connection with the old stump as possible,

possible, certainly not more than sufficient to convey the sap, and afford adequate nourishment to the plash or layer; for which purpose a good workman will at a stroke cut it almost through. By this means the stump will soon throw out fresh wood for a young fence, as the layer is only intended to serve the purpose until the young one gets up again. Those who practise chopping up hedges may say, "Why not chop up the hedge?" But I say, Who would prefer a dead fence, when he may have a living one? It is to be understood, that the healthiest and best shoots are to be left for the purpose of laying down to fill up the thin places; and a sufficient number must also be left for the purpose of stakes, which are better of a small size, about the thickness of a walking-stick; for, as they are to be left growing, they will soon increase in bulk. They must be cut off to the height of the intended fence, as they will grow with it, and are to be left at a proper distance from each other. The hedge must be thinned of all wood but that which may be wanted for plashes, or stakes;



stakes; and in those counties where fuel is dear, the superabundant wood pays the farmer amply for the expence of plashing.

It has been an objection of long standing, that the farmers in the northern parts of the kingdom, and particularly in Yorkshire, lay their plashtes too high. It is certainly a wrong practice; for by such means the sap or nourishment is all conveyed into the plashtes, the shoots are robbed of their food, and become trifling and weak at the bottom, and the hedge is reduced in the part where strength is most required. In fact, in plashing he will do his work in the best manner who avoids either extreme of high or low, for both are pernicious.

When the layers are interwoven with the living stakes, and the hedge dressed by cutting off superfluous twigs, it will be proper to give the layer a nick or cut with the hedge-bill at every foot distance; for by this means the sap will be prevented from rising too rapidly, and the layer will push out a far greater number of branches betwixt each nick.

By

By attending carefully to the raising and keeping in order live hedges, you will remove one great temptation which the idle poor have in dead fences, to bring up their children from the earliest infancy in the habits of thieving, and which vice, being literally sucked in with their milk, generally clings close in a maturer age. How often do we see a ragged family consisting of a woman, half a dozen children, perhaps, one probably at the breast, returning to their miserable cottage laden with the plunder obtained from dead hedges, and consuming that time in pitiful pilfering, which, if honestly and industriously employed, would procure them a comfortable subsistence! In vain does the law threaten punishment, or the farmer cause it to be inflicted—a clamour is raised against him for cruelty: the depredators are seldom deterred, but proceed gradually to higher crimes until they finish their career in public, or by good fortune pass the remainder of their lives at a distance from Europe.

If for the first two or three years after  
plashing

plashing the field is ploughed, the hedge will thrive much the better for it.

## SECTION LXXIX.

### *Management of the Dairy, making Cheese, &c.*

THE choice and management of cows are the first things to be considered in a dairy. I have already described in Section XXVIII. the sort of cow most profitable for the dairy: it remains to speak here of the proper management. Twice each day, at regular and stated hours, it is necessary to be careful in milking the cows perfectly clean; as any milk left in the udder may occasion more loss than the quantity left behind. This will be easily conceived by those who want a cow to go dry; for they know that the most effectual method is to leave part of the milk in the udder, and the cow will daily decrease in her quantity, and soon become dry. It is adviseable, when

the cow appears to have given all she can, to rub her udder and stroke it down with your hand, to give an opportunity to the milk that lies high up to come down. That done, draw her paps again, or *strop* her, as the milk-maids say. The cow by such means will increase her milk; for nature will abundantly supply the loss if the animal has plenty of food.

It is not unusual for a cow to gargle in the time of her giving milk, which malady arises solely from bad milking; for the gargle is a conjection of milk in the udder; which in general will give way to any of the common fomentations. The cow, although certainly more valuable than the race-horse, is not so much the care of the present age; nor does the modern parent bring up his daughter to the business of a dairy or household work. If he can afford any education to the child intended for a servant, his money is spent in teaching her to dress hair, and to acquire a little smattering of the French tongue; and instead of being qualified for a farmer's wife, miss dashes into the world  
a lady's

a lady's maid ; and if she has a tolerable face or person, she soon changes her situation.

Having endeavoured to show the necessity of milking the cow perfectly clean, I shall say a few words concerning the dairy where the milk is to be deposited. In respect to the situation of a dairy (and we will suppose a building erected for that purpose only), the aspect should be due north and south. The north front should have the greatest number of apertures for the admission of cold air ; and there should be a sufficient quantity of trees on the south front to shade the building from the sun. Where the situation will permit, it should be sunk three or four feet below the surface, proper drains laid, and an area made round it to prevent damps. You may go down to it by a few steps, or the ground may be dug away on the north side for six or seven feet wide, and you may descend by a gradual slope to the door. The windows or openings may be covered with wire, such as is used for making sieves, which will freely admit the air and keep out the flies. The



floor should be of stone; and the walls should be covered with a strong stucco, or with glazed tiles. At the east and west end niches may be left for the purpose of ornament, and the convenience of placing large jars or vases to hold cream. The frame which is to contain such vessels as the milk is put in to set, may be supported by pillars of stone, which for the sake of cheapness may be made square; the frame itself may be of oak, and the pans (which are made for the express purpose) of glazed earthen ware—for I by no means approve of cisterns or troughs lined with lead; milk being so far corrosive, that it will in a short time produce a ceruss. The necessary shelves, &c. may be placed to the fancy of the owner. At one end must be a door of communication to the scullery where the copper is placed, and where the dairy-maid is to do a principal part of her business.

I have here given a sketch of a dairy that may be fitted up in a style of elegant neatness, and at a small expence. There are some which are far more costly, and I know

of

of none which, for the size of it, surpasses that made by the late Captain Foulis on Epping forest. It may not perhaps be deemed impertinent to give a short description of it, though few have the power to imitate it. The building is nearly square, as it was not originally erected for the purpose; the floor is a marble mosaic pavement, to which you descend by half a dozen marble steps. There is a strong frame of fir timber (as oak emits a liquor that dyes marble of a deep red colour), which is supported by a number of small columns of the Doric order about three feet high, with their capitals and bases all of white marble. On the frame are placed a number of white marble troughs, which by their projection are so contrived as completely to conceal the wood work, and are as highly polished as china-ware—a precaution very necessary; for without it the corrosive quality of the milk would render them like a honeycomb. These troughs have each a hole cut through for the purpose of emptying and cleaning them, being too weighty to be moved; and

they have stoppers of cork with a silver ring and chain, almost like those used for decanters: the walls are encrusted with porcelain tiles of a foot square made in China for the express purpose, and so contrived that by means of laths passed through them, they seem to form one solid body. The shelves are of white marble, and supported by cantilivers of the same curiously inlaid. The roof of this little curiosity forms a dome, which is terminated in the most elevated part by a very valuable and exceeding large shell, of a fine blue tint resembling the sky on a clear summer day: in short, the whole of the dome is composed of valuable shells from the East Indies, which but few persons can have the opportunity of procuring.

We will return to the farmer's dairy, which may reasonably be supposed to have a free circulation of air, at least enough to cool the milk expeditiously; and until it does become so, it must be kept moving in the kit. The exact degree of coolness at which it is proper to pass the milk through the strainer might be ascertained, as in the brewery,

brewery, by a thermometer, which, ridiculous as it may seem to some, I hope to see as common in the dairy as the brewhouse. Surely a thermometer is more to be depended upon, than the uncertain and not very delicate method of immersing the hand. I do not insist upon it that the use of this instrument would establish an unerring method of making both cheese and butter; but no one will cavil surely at an attempt to bring such useful articles to perfection. The practice now is, to guess by the touch when the milk is cool enough to cast the cream, so as not to froth at top, hang ropy or cling together like the scum of boiled milk; but, when creamed, part freely, as smooth as a well-boiled custard.

Milk in a good dairy will keep from four to six meals old (or about three days), and continue casting cream to advantage, if the vessels are well scalded. If the cows have had wholesome and sweet food, there is no fear but that the butter from cream so kept will be good. But I must repeat my caution

not to keep milk for such length of time in vessels lined with lead.

Too much attention cannot be paid to cleaning the vessels you strain your milk into. The cream-coloured ware made by the potters in Staffordshire is by far the sweetest and easiest cleaned, owing principally to the superiority of their glazing; but some for the sake of cheapness (except those who having very large dairies adopted those filthy troughs lined with lead) make use for the most part of earthen pans, which being glazed by a coarse composition of sand, lead, wood-ashes, and a little salt, require much care in the cleaning. For these pans you should have a copper (but an iron pan is much better) large enough to boil them in, and those who have not the conveniency of copper or pan must put the earthen-ware in a tub, setting one within another in boiling water. Wash them out first in a small quantity of water, which must be preserved for the pigs. The pans must remain some time in hot water, that they may be sufficiently



ciently scalded; and when taken out must be wiped perfectly dry with a clean cloth, and set abroad in the air upon a rack made for that purpose, where they will become perfectly sweet. Wooden vessels are used by some, and are reckoned to cast the cream quicker and more of it than any other: but they require more labour and care in cleaning, and are costly.

If your cows have eaten any kind of food that causes the butter to be disagreeable to taste or smell—turnips for example, which few admire at second hand—put a small quantity of sharp vinegar into the bottom of the pot or pan for holding the cream; and by pouring the cream upon it the disagreeable flavour will be lost, or in a great measure taken off. I have tried many other things, such as cream of tartar, lemon juice, nitre, &c. but good vinegar is the cheapest and in my opinion the best remedy.

To have butter of the finest quality possible, the cream ought to be churned every morning. The churn must be kept very clean, and cold water remain in it for some

time if the weather is hot; but in cold weather the water must be put into the churn hot, and poured out after rinsing round several times, and the cream immediately put in. In hot weather set your churn in a cool place when the cream is in; and churn slowly, or your butter will be light and soft. In cold weather you will do well to set your cream in a pot before the fire, or put it in warm water, and stir it about to warm the cream before you put it into the churn; and churn by the fire-side. In winter the cream is liable to flow or swell: you must then pour some hot water upon it when it rises in the churn, and it will make the butter come the sooner. In summer if you put cold water in the churn with the cream, it will stiffen the butter, and make it gather quicker, as hot water does in winter.

When the butter is taken out of the churn, wash the butter-milk from it by two or three good washings with clean spring water, sprinkle salt over it, and mix the salt and butter well together. The quantity of salt

salt necessary must be regulated by your taste. In summer put the butter into some spring water for a few hours, then work it well with a butter-dish made purposely for that use.

*To make cheese.*—The following are the sorts of cheese made from cows-milk only; for in England we are not so frugal as those on the Continent, who make both sheep and goats contribute towards furnishing the article; we content ourselves with purchasing as dainties what we are too idle to make at home, from materials which abound in greater plenty than with those who make use of them to advantage.

To make what is generally called Stilton cheese, let about half the quantity of the milk stand until it becomes acid, and coagulated or *lapped*; taking care to skim off the cream before it is perfectly sour, which you will preserve in a pot for a day or two before it is used. Stir the cream in the pot as if for churning. You must, the day before you make the sour milk into curd for cheese, prepare a quantity of milk just taken  
from

from the cow, and make that into curd; and when properly drained put the curd into some vessel, adding a sufficient quantity of spring water, and let it stand for twenty-four hours. The next day take the lapped milk with the cream put to it; add some other milk one or two meals old with the cream belonging to it. The quantity of curd put into the water ought to equal that of the old milk. Mix the different curds together as well as you can; put the whole into a vat, or tie it in a cloth—if you choose to have a round cheese; but if you prefer the form of the Stilton, the vat must be deep and narrow. This sort of cheese must be pressed very lightly, and must be frequently turned in the press. By light pressing, the cheese will retain its richness; by frequent turning, both ends will be alike in goodness. If you suffer one end continually to be undermost, the upper part will not be so rich. A round cheese must also be often turned, sometimes one end uppermost, sometimes the other; and the more gradually you press any kind of cheese, the better.

better. The richness of cheese in some measure depends upon the quantity of cream; and as you are lavish or sparing of cream, will your cheese, if properly managed, be rich or poor in quality; but no better need be made than what is above directed.

Some precaution is necessary in respect to drying cheese. Care must be taken not to dry it too quick. No cheese should be kept either very wet or very dry, after being once properly cured. In curing cheese you salt it as you would do butter, and your palate must be the regulator. Those who are fond of the taste of salt sprinkle a little in the curd. By mixing the curd as above directed, your cheese will turn to a blue mould. But to make a cheese decay expeditiously, bore a hole with a cheese-taster, and pour some ale, porter, or, if you can afford it, some port-wine, into the hole some little time before you intend to use it—the epicure will not think the wine wasted.

If the cheese is made very rich, it is liable to be spoiled by small insects called salt-worms, which frequently in summer breed



breed in cheese before it becomes dry, and quickly destroy it. In winter the salt-worm is found in cheese; but at that season does very little damage: it is esteemed a delicacy by cheese-eaters, who devour thousands after a hearty dinner.

Cheese is dried on boards, which must be kept very clean by frequent washing with boiling water, and wiping with dry cloths. When the boards are washed, the hotter the water is used the better: to scour them with unslaked lime is an excellent method; for I know of nothing which becomes sooner putrid or emits more foetid effluvia than the whey of cheese. It will be necessary to turn cheese twice a day for the first two or three days after it has been laid on the board, and to wipe both cheese and board each time with a clean cloth. The place it is dried in must be screened from the sun, but have a free circulation of air. I do not mean that it should be exposed to a current of wind; for that would cause the cheese to crack: it must dry gradually in pure sweet air. A Stilton cheese should be  
twelve

twelve months old at least, and kept in a pot in a cellar, or some damp place, a month before you use it.

They make a cream-cheese at York and the environs, which is called *York-cheese*. Very little ingenuity is required to make such cheese, as it is nothing more than putting a quantity of good sweet cream into a cheese-vat, with some green rushes sewed together on purpose at the bottom of the vat, which must have a sufficient number of holes to let the whey which drains off pass freely away. On the top of the cheese you must likewise lay rushes in the same manner as at the bottom. It is usual to make these cheeses from one inch to one inch and a half in thickness. The thinner they are made, the sooner they are ready of course, as this cheese is in fact no more than cream dried sufficiently to be cut with a knife like butter in cool weather. There can be no new cheese better than this York cheese if properly managed.

There is another sort called Trent-side cheese, which is excellent for toasting. It is

is made all of new milk put rather warm together. This sort of cheese is apt to rise, heave, or blow up; but that may be easily prevented by putting in a small quantity of sour milk, or butter-milk, or by pouring some boiling-hot milk or whey over the curd. Yet many tons of cheese are spoiled by heaving. Trent-side cheeses are pressed quicker, and made from two to two inches and a half thick; and as soon as they will bear taking from the board, they are put to dry on a rack edge-wise. The rack must be made to stand from the ground, or hang by ropes.

Care must be taken to secure your cheese from rats and mice; for the common enemy of rats and mice will not guard your cheese from depredation. Cats are fond of new cheese. Your remedy (supposing the rack to be raised upon feet to a proper distance from the ground) is to surround those feet with tin in a conic or sugar-loaf shape, which will prevent those destructive vermin from crawling up. I speak of rats and mice; for, as to cats, they are so nimble that nothing

thing but exclusion can preserve your cheese from them.

When the rack is made, the spindles must be placed at such distance from each other as you intend the thickness of your cheese to be: for instance, Stilton cheese (not that which is hung up to dry in nets) is made from nine to eighteen inches thick—the Trent-side cheeses, two inches and one half thick. The Cheshire cheeses are made very large. Large cheeses are not very profitable to the farmer. A large Cheshire cheese, though so highly esteemed all over the world, and preferred in Italy to the Parmesan, will not enrich the maker very speedily; as it will take seven years to ripen, and a Stilton cheese will be in the highest perfection in twelve months. The Trent-side cheese is in high perfection in six months, and bears carriage well, as it has a very tough coat. The York cream-cheese may be used in a fortnight or three weeks. We must allow Cheshire cheese to be the best of any for exportation.

There is a fort called Cottenham or  
Eddish

**Eddish** cheese, made at the latter end of the year. This cheese is made like that called **Trent-side**, before mentioned, and is liable to rise: therefore it must be made thin; as the thinner a cheese is, the less apt it is to rise. The reason is very simple. When thin, it must of course contain less whey, which, when redundant, produces fermentation. It may seem unnecessary to repeat, that great caution must be used to prevent rising. By putting milk together very hot, and adding the runnet immediately, the whey will come green, drain away much easier, and most probably prevent the rising; but the cheese by this management runs the risk of being poor. If you take the curd, break it with your hand and knead it into the cheese-vat, the whey will drain from the curd; and by pressing the curd very hard in the cheese-vat you may in part, but not totally, prevent the rising. At the season this cheese is made, you may not perhaps have any sour milk: in that case you must put the milk hotter together.

There is another sort of cheese as useful  
and



and much more profitable than any of those before mentioned, which is skim-milk cheese. The method of making this is similar in all respects to the method already laid down for making Stilton cheese if you wish to have it mouldy. But if you prefer having it sound, you must put the lapped milk and the sweet milk together, and put the runnet to it much hotter. This sort of cheese may be made to keep for as great a length of time as any ; and, if made as directed for the Stilton, it will seem to the palate as good as cheese made of half new milk in the common way. I never knew a working man who did not, after being used to this cheese, prefer it to any other to make a hearty meal of. This is without doubt the most profitable method of managing a dairy where you have no ready opportunity of selling milk ; as you may thus be able to send more butter to market. The hotter any kind of cheese is put together, the sounder it will be ; and the cooler you put it together, the richer you will find it, and the sooner it will decay.

There is another sort of cheese called Slip-coat, which is made by mixing one quart of warm water with two quarts of new milk (or any larger quantity in proportion), and putting runnet to it. Then take the curd gently out of the whey, and lay it on a cloth spread over the cheese-vat. Press the cheese very lightly for twenty-four hours; take it out, and put it in some warm situation where it may have the benefit of the sun. It must be placed between two dishes: when it begins to slip, you may put dock leaves, or the leaves of sycamore, above and below the cheese. This is a profitable cheese to the maker, and, if well managed, is but little inferior to the cream-cheese. The thinner this kind of cheese is made, the sooner it will be fit for use, and the sweeter to the palate; for, if it is made thick, the outer part will spoil before the inside is changed from curd. This cheese will keep but a very short time: but you may regulate the quantity to be made according to the demand for it.

Cheshire cheese is made of new milk; and you cannot easily err in making it; for  
the

the rich flavour and the mellowness of this cheese are given it by an addition of beef suet, or any other wholesome and sweet fat well clarified, which is poured into and mixed with the curd, together with a sufficient quantity of salt, which is absolutely necessary to prevent the fat contracting a rancid flavour. As much precaution is required in this respect as in curing bacon.

It is to be observed, that all cheeses except the Cheshire will be sufficiently salted by rubbing them with a little salt after being taken out of the cheese-vat, and repeating the same operation for a few days.

Cheese is easily made of any colour. Yellow is generally the favourite; and this is given by bruising marygolds and mixing the juice with the milk, which is both pleasant and wholesome. Many prefer a green colour, which may be communicated by mixing in the manner just mentioned the juice of sage.

In winter some use the juice of carrots for colouring butter, which is certainly a great addition; but butter coloured with

R 2

carrots

carrots will not keep for any length of time.

The best method of preserving cheeses intended for keeping is to put them into a barley-mow, not suffering them to touch each other, and securing them from rats and mice. This will save a great deal of trouble, by keeping the mites from breeding in them, which are very destructive where there are large quantities of cheese. Before the cheeses are deposited in the barley-mow, they must be well washed with hot whey, to take away and destroy both the mites and their eggs, or they will increase in the barley-mow most rapidly.

Rennet, runnet, or what is commonly called *earning*, is properly the acid juice or curd found in the stomachs of calves whose food has been only milk, and who are slaughtered before digestion is perfected. But the butchers have a succedaneum for the juice, by infusing a piece of the stomach where the curd lodges (called by them the cheese-lop) in salt and water; and this effectually answers the purpose intended.

## SECTION LXXX.

*Management of Poultry.*

AT the time I profess giving directions for the management of poultry, I cannot avoid hinting to the farmer, that he must not rely upon the profits arising from breeding and rearing poultry for the payment of any part of his rent. I do not mean to discourage raising what I am fond of eating: but I should not prove myself the friend of the farmer if I did not show both sides of the question, and tell him it is possible to lose by mismanagement in this article, and scarce probable to gain, unless he selects a particular species or sort.

We will for example begin with Turkeys—those voracious animals, which will devour as much as any quadruped on the farm, not excepting even the hog, which can be raised at less expence. Calculate, if

R 3

you



you can, what a turkey will cost by the time he is fit for the spit. So soon as hatched, he must be treated delicately, fed on white bread and milk. The pip comes on, which must be cured with fine wheaten bread and fresh butter mixed with some herb-grass or rue. On this kind of food he will live until he is a month old; when he must be fed with whole oatmeal and milk, and care must be taken that the milk be perfectly new and sweet, or your turkeys die in a few hours. When two months old, they will live upon small wheat, and by the time harvest comes on will provide for themselves at your expence. If the craw of a turkey were taken out in the evening about Christmas, the corn measured that would be found in it, and the quantity multiplied by the number of days since the turkey attained the age of two months, the product would startle the farmer—without taking bread and milk into the account, which is no trifling matter. Few turkeys are fit for the kitchen but what cost the farmer from twenty to thirty shillings, although

though he sells them at market for four and six-pence, or five shillings.

We will suppose that thirteen have been the brood hatched. The breeder may think himself fortunate if from six to ten are raised. Then come two to share in the profit of what they have contributed nothing to the expence of—I mean the tithing-man and the fox, who may not be content with a tithe only; and you may add to this catalogue of expences the keep of the old turkeys the year round. I could rear a horse upon less corn than two turkeys would devour, if they were at liberty to help themselves. I have been told that in France they have an extraordinary method of fattening them with walnuts, which these devouring birds swallow whole, to the number of a dozen within the day; and they digest them as the ostrich is said to do iron. In short, I would advise the farmer to leave the breeding of turkeys to gentlemen of fortune.

Though I have said so much against turkeys, yet there are some tracts of land where

they may be bred to advantage; as in the marshes of Lincolnshire, where little or no corn is grown. In such places they might be reared on the bent or seeds of grass; but such food does not fatten them for use; therefore, the advantage is solely in the breeding.

Chickens, though by many degrees not so bad as turkeys, will not pay for breeding.

Geese are profitable; for they will thrive on grass and water, and plucking them twice a year amply pays by the feathers for the grass they eat. A peck of oats managed properly will fatten a goose so as to be worth from four to five shillings in her feathers; and oats must be scarce if a peck is valued at nine-pence, which is twenty-four shillings per quarter. But, supposing a goose to eat a peck and a half of oats, the cost will not exceed thirteen pence half-penny; so that a goose will pay the breeder.

Ducks may be estimated on the same footing as geese; and where you have the advantage of water, they will pay well for breeding.

Pigeons,

Pigeons, to those who have no corn and can reconcile their consciences to the plundering their neighbours, may be profitable; for little regard is now paid to the statute which forbids the erecting a dove-cot but by leave of the lord of the manor, or even keeping pigeons without his permission.

To the farmer whose pigeons eat his own corn they are very expensive. Pigeons are gluttons; the quantity of corn they devour is almost incredible; and the havock they make at the time corn is ripening is astonishing. By alighting upon it in flocks, they press it down in such a manner as to destroy a much greater quantity than they eat. In short, pigeons are as destructive amongst corn as pigs.

All other domestic fowls being kept more for pleasure than profit, it is needless to mention them.

## SECTION LXXXI.

*The Necessity of Improvements in Agriculture :  
the great Advantage thence arising to Indi-  
viduals, and to the Public at large.*

THE necessity of improving this primary and most useful art, by which we exist (for we must ultimately depend upon the produce of the earth for support), has been too recently proved by the large sums of money sent out of the kingdom for corn, which might with so much advantage to the community have been raised upon a small portion of the uncultivated wastes that to the disgrace of the kingdom exist here in such abundance. If the truly patriotic proposal of that philanthropist, Sir John Sinclair, for a general inclosure of commons had been carried into effect, we should in a little time have increased our population,  
have



have found plenty of employment for the laborious poor, and have afforded our numerous mechanics and artisans provisions at a cheap rate—the grand desideratum in a country depending so much on the auxiliary aid of manufacturers and commerce. The present miserable state of Holland affords a striking lesson of the instability of trade; and of the distresses a nation is liable to, which without internal agricultural resources relies solely on commerce for the importation of the necessaries of life.

However high the science of Agriculture is at present, and however near perfection some persons may suppose it has arrived, I do not hesitate to assert that, take all such land through the kingdom as is in a state of cultivation, it does not produce one third of what it is capable of. Surely no one will deny, if my assertion be fact, the necessity of improvement; and I flatter myself in the foregoing sheets to have given some useful instructions for that purpose. I cannot avoid reverting to the quantity of  
uncultivated

uncultivated ground, and especially where ground is so valuable, in the vicinity of the metropolis of this great empire! London is nearly surrounded at a very short distance by commons! What a pity it is that those who have gained a competency in business are not suffered to purchase parts of these at present useless tracts. We might then see the city shopkeeper, perhaps a man-milliner, become a useful member of society; and, if not tilling his own field, at least giving employment to whole families, calculating what a landed estate he shall leave behind him, keeping his faculties in action, enjoying the pleasures of a rural life, and leaving others to drudge in the shop and accumulate money in their turn.

To improve agriculture is the means to create plenty, which so much adds to the happiness of man; as it makes him contented with his condition, and with the constitution and laws of his country.

To obtain plenty a man must be industrious; and industry so much fills a man's mind as to give recreation to every moment

ment of his time, prevent all idle thoughts, vicious desires, and cause him to wish well to every one around him. He begins to consider himself a part of the state, when, by successful labour, he sees himself blessed with independence. The innocent amusement of tilling the soil, the regularity of hours required in the occupation of an attentive husbandman, and going to bed with the sun, and spending all his days in a free air, the harmony of the birds, the fragrance of the fields, give to the farmer calmness and serenity of mind, and pleasures unknown to other men. His expectations from the improvement or experiment he makes are seldom blasted; for land is so wonderfully grateful, as to make a return for every favour shown her. In his labours there is no tedious sameness, but something new every day to amuse him.

The improvements agriculture is capable of are boundless: in all past ages it has been progressively meliorated; and by attending to the directions given in this Work, arable land will supply the market with double  
the

the quantity it has hitherto produced ; and the expence of cultivation, in a great many instances, will be less. From the produce of the land we all exist: from that source all our trade derives its origin and support.—As to foreign commerce—no country would supply us with what is useful and agreeable, if we had nothing to give in return: and the greater the plenty we have of the necessaries of life, the more numerous and cheap will be our manufactures to supply the markets abroad.

The cheapness of provisions arising from an improved method of agriculture would likewise tend to check the present alarming spirit of emigration ; for none would be apt to relinquish his country and his home, if he could no where live better or cheaper.

The farmer often complains of the dearth of labour. But the price of articles of the first necessity must be reduced, before that of labour can be expected to be lower. No man can live without meat ; still less the working man, who is the real support of all. Thousands and tens of thousands of pounds

pounds are lost for want of employing the lower class of people to raise that which would make them the most useful, happy and independent of men. We none of us get more than meat and clothes ; and he that earns these necessaries by his own labours, is the really blessed : his disappointments are few and small, his enjoyments many. Health, the greatest good that any man can enjoy, is more likely to be found in his cottage than in the luxurious palace. Early rising, the regularity of his diet and exercise, preserve both his body and mind in a state of sanity.

It is every one's interest that land be improved, even of such as live upon salaries, certain stipends and annuities. If they can buy beef for 4*d.* per pound, instead of 9*d.* per pound, and a penny loaf of bread for a half-penny, it puts it in their power to live in a more sumptuous manner ; and the tradesman can live on less profit, and every one in turn. The taxes are more likely to be paid, if every man brought two quarters of wheat



wheat to market instead of one, and every other product of the land in proportion. Instead of the present exorbitant poor-rates, there would be only a trifling contribution required for the support of a few old people and fatherless children. We have all these resources before us: both land and people already prepared.

It is true there are many thousand acres uninclosed, and very improperly employed. But I am of opinion, that acre for acre, the commons according to their value feed more stock than the inclosed lands. I have reason to believe that inclosing of open common fields, causes a diminution of grain. From the appearance of all old swards, it is evident, they have been ploughed and sown with corn. When inclosed, the land is divided into grass-fields, and seldom tilled; and on many thousand acres of inclosed land the grass grows to very little purpose, as it is either not above half eaten, or covered with thistles and other noxious weeds. In many parts of the kingdom, according to the present system, four acres maintain,  
on

On an average, no more than one cow, or one horse, twelve months. I will undertake to keep ten cows and ten pigs, and produce ten acres of wheat every year upon twenty acres of this land, that now only keeps five cows and two pigs. I shall have from fifty to sixty quarters of wheat upon the ten acres, and buy no manure; the produce of the land furnishing sufficient for it.

But let it not be understood that I am an encourager of wastes and commons—I hate them. It is not, indeed, to be ascribed entirely to the industry of the people that commons are so abundantly stocked, but too often to envy. The man who possesses right of common thus reasons with himself: “Although it is of no use to me to stock the common; if I neglect to do it, my neighbour will enjoy the whole as if it were an inclosure belonging to him. Therefore, to prevent him, I will injure myself.” It is wonderful to see what numbers of sheep feed upon the commons in Westmoreland and Cumberland; and yet I would not have that land for inclosing to divide

into fields ten acres each field. I could apply money much better, by taking land of a more fertile nature. There are, however, thousands of acres with a rich and improvable soil uninclosed, which in their present state are very hurtful to the community. For instance: if my neighbour has sheep infected with the scab or any other disease, I am compelled to expose mine to the contagion. Nor in common fields is there any encouragement to attempt improvements; for I must do as my neighbour does; must sow corn one year, and stock the field another, when it is fallow. I do not know a more droll idea than when the farmer extolls the use of the fallow to keep sheep upon, which is a very frequent phrase to express the use of the field the fallow year, when it ought to be without either grass or weed. If one man chooses to be negligent and till his land improperly, has a crop of thistles, and lets them stand for seed, I must reap along with him the benefit; as the seed of thistles will not confine itself to any particular spot.—It would be difficult

to

to persuade the prejudiced farmer, that a crop of fine corn, clover, or turnips, would less exhaust the land than what he calls that year *resting* it. Now, had that part of the field produced a good crop of corn, the straw, properly treated, would make a dung-hill, the grain would sell for money, and the ground be in a much cleaner state than with the crop of weeds upon it.

Since I have been in London, I have ridden out and taken the liberty of examining into the mode of agriculture near Town, called *gardening*. A large quantity of the land was full of couch-grass and weeds of all denominations, some in full bloom and others in seed. I saw one field of rye betwixt London and Wimbledon-Common where the thistles had mastered the rye; and the farmer was cutting them down before the rye was ripe. Were you to converse with him on the subject, he would endeavour to persuade you that the expence of destroying the thistles would have exceeded the value of the crop. There are more weeds in the crops of corn near Lon-

don than I ever saw in any other part of the kingdom I have travelled through. It may be of use to enquire into the causes of the farmer's neglecting his fields, and suffering them to be over-run with weeds. I suspect it is owing to the value of the produce of the land having risen in a greater proportion than the land itself. If a man has a farm of one hundred acres, and he cultivates but ten acres, and the produce sells so high as to enable him to pay the landlord his demand, and to maintain his family; it is the same to him as if he tilled all the hundred acres properly. Supposing the ten acres to produce forty quarters of wheat, and that wheat sold at 8*l*. per quarter, he would receive 320*l*.; and, if his rent were 100*l*. he would as an individual be better off than if the whole farm had been sown with wheat, and produced four hundred quarters when wheat sold at 20*s*. per quarter. But how much does that injure the public at large, and especially manufactures and trade, which from the dearness of provisions must in time

be



be inevitably diminished! Beef and mutton used to be 3*d.* and 4*d.* per pound, and are now sold at 7*d.* per pound in many places. This affects not all who eat meat, but all those who are not concerned with the landed property—the farmer the *least*. But it affects all mechanics and tradesmen of every description. Therefore it soon falls back upon the land; for the grocer must have a greater profit on his sugar, candles and soap, and the taylor more for making a coat, &c. or they will not find money to buy your beef. The man of landed property, then, only holds the money for a time, as all mechanics and traders whatever must have the means to buy the beef, bread and butter at the advanced price. Now, to prevent the above evils, what must be done? I dare say every thinking man will allow the land in its present state does not produce all it is capable of producing. Therefore we must endeavour so to cultivate it that it may send more to market; viz. by tilling it and raising crops of corn, turnips, clover, &c. I am of opinion two thirds (if not one half)

of the grass land in the kingdom would keep, if properly managed, the same quantity of stock that the whole now does; and there would be one third left to be ploughed. This sort of management would not only fill the markets full of grain, but of flesh; for in winter, when cattle, sheep, and horses require most support, they derive their food chiefly from the produce of the arable land.

But some will say, "There are neither people nor money sufficient to put this plan in practice." I on the contrary opine, there is of both; for, if the money expended in the execution of the present poor-laws for removals, collection-charities, &c. were applied to pay the people for working and cultivating the soil, almost the whole country might be made like a garden. How many thousands who are able to work, lounge about doing of nothing! What might not these idlers, if properly employed, effect; when the few who at present do work, maintain themselves and so many thousands who labour not and are

of no more use to society than a pack of hounds—fit only to consume !

In the year 1785, when an alarm of a famine prevailed, I was struck with amazement to hear folks talking of wanting in a country like this; when I was certain I could increase the produce ten-fold in every parish I knew; and in many of them there were great numbers of idle people to be employed in improving the land. There need not be ten times as much more raised as there is, to enable the farmer to bring ten times as much to market; for the quantity of provisions allowed at present for the support of his family and labourers would be almost sufficient for them, if he cultivated his farm according to my Improved Method; and whatever he raised more than is at present produced, might be sent to market without any considerable deduction.

Indeed, were the land all put to its proper use, it is almost inconceivable how much might be raised. For instance, a quantity of nuts equal to that imported from abroad might grow on the land where the present fences stand; and every ten yards

an apple or pear-tree might be planted. Some of the children of poor labouring people might gather them: such an employment would certainly be preferable to idleness; for the sooner youth who is doomed to earn his bread by his labour is put to it the better. As every man must fence his land in, and must have one end and side; every ten acres will have four hundred and forty yards of fencing; and, if planted ten yards asunder, there would be forty-four fruit-trees. If every tree bore 5s. worth of fruit, the value of the whole produce would be eleven pounds—a decent rent for the land: and where the hedges consisted of nut-trees, the nuts might be sold for a like sum. Nut-trees are easily raised from cuttings; and they would form a strong, beautiful and durable fence.

The size of farms having of late considerably attracted the attention of the public; it may be useful to enquire whether large farms or small ones are the most useful to the community at large. And here we must not confine our views to the present state of agriculture. The greater the  
number

number of people employed in cultivating the soil (if their labour be sufficiently recompensed), and the greater the produce from each acre, the better. Abundant crops are chiefly owing to the industry and ingenuity of man. It is of no importance to the landlord whether the farms be large or small, if they be equally well cultivated, and his rent regularly paid. But the too prevalent practice of letting only large farms considerably affects the welfare of the public and of individuals; as it often extinguishes emulation, industry and habits of economy among the labourers in husbandry, and prevents many a man of small property from becoming a farmer. Where farms are so large as to require thousands of pounds to stock them, a few hundreds are of no avail; and where the farms require hundreds, scores of pounds will not do. Therefore the possessor of such small sums turns them into some other channel, becomes corn-jobber, beast-jobber, &c.; whence often arises a dangerous monopoly.

Indeed,



Indeed, if the land-owner be content with such a rent as the tenant can continue to pay from his farm in grass, one man might hold a county for a sheep-walk. I knew an instance where a man and his two sons, neither of them above fourteen years old, looked over five hundred acres, at 10*d.* per acre. The land was so rich, that it would on an average carry four sheep to each acre, one beast to three acres, and a horse to five acres; and in the winter two sheep to each acre; yet I have frequently heard the father complain for want of work; as one man could look after a thousand acres with ease in the winter—although (the land being divided into small pastures, of from four to twenty acres each) the man and boys kept the fences in order likewise. But were the landlord to call for an improved rent upon his land where the soil is proper for cultivation, twenty acres would probably employ four people in sowing, reaping, thrashing, &c. One hundred people then would be employed on the five hundred acres, instead of the man and his two sons; and

and in harvest-time, two hundred instead of the three labourers. Now, if this land were again converted into pasture, the three working people would have all the rest to maintain, and the ninety-seven become paupers, not because they would not work, but because they would have nothing to do, and would be most unjustly called idle and abandoned, while the father and two sons are people of credit from their employment. Therefore it appears that small farms, where the land is good in quality, are most beneficial to the community. In the time of harvest, the wife of the small farmer will put a helping hand for herself, though she would not work for hire; the sons or daughters will do the same; and the servant-girls and every branch of the family cannot refuse to assist at reaping, when their mistress sets them the example. But if the farmer be a man of property, and keep servants in livery, ladies' maids, &c. these, by the tempting stories they tell of their manner of living in London, of going to the plays, &c. debauch the minds of the lower servants, who

who soon begin to ape the others, and consider as beneath them the toils of agriculture.

If a gentleman wishes to employ some of his property in making experiments in agriculture, in improving the breed of cattle, &c. he should keep such an establishment entirely distinct from the rest of his household, in a farm-house managed by a farmer, who should work himself and have a servant or two under him. Instead of reserving one large farm for such a purpose, I should advise him to have half a dozen consisting of about one hundred acres each; it might excite emulation among the different managers, to improve with the greatest skill the land under their care. The steward, or some other intelligent person, might give the general direction, and superintend the whole.

Where excessively large portions of land are allotted to one farm, the house, barn, stables, &c. must be at a great distance from some of the fields; therefore the produce must be brought a great way, and the manure carried back as far. One shepherd,  
indeed,

indeed, would do for the whole so far as relates to sheep; but the leading of manure, the going to and from plough, carrying the harvest, &c. are attended with both loss of time and expence.

It may be objected, that the thrashing-machine of the large kind, which saves so much time and money, will not suit a farm of small extent. But I am of opinion, from the nature of the machine, that it may be constructed upon a smaller scale, and at much less expence, and worked with only one horse. This will save the wages of one person; for one horse will work without a driver; but two do not: and to attend and feed the machine, which requires no exertion of strength, and may rather be considered as wholesome exercise than toil, I would employ women, children and the infirm: and thus the very people who are at present maintained by parish pay, might thrash all the corn the land produces.

In the practice of agriculture recommended in this Work, more hands are necessary: therefore it is my wish to find them,

them, and of such a description as are now idle, or at least have not work to go to. I do not mean to attempt to make the man work who can live without it: but the poor people would find themselves of more consequence if they were in employ—and indeed so they actually would be. It is reasonable that every one upon a farm, or in the parish, should work for his living; and that, according to the old saying, the farmer should “keep no more cats than will mouse.” To be sure, if a man works himself as a farmer, it is good: but it is much better where he so calculates his matters as to make every one that is liable to partake of his industry to earn their own bread and his likewise. The master of any extensive business gains more money by his head than by his hands, in directing others to execute their task properly: but, to do that, he should have a perfect knowledge of it himself, otherwise he will cut but a poor figure.

Many will be deterred from dividing a large into smaller farms, by the supposed  
great



great expence of the buildings: but, from many well-formed plans, calculations and experiments, I am convinced it will be nearly the same, whether you erect one large house, barns and stables, &c. or fix on a smaller scale; and the cattle in a fold of a moderate size thrive much better.

There are, however, considerable tracts in the kingdom that ought to be in large farms, viz. such as will not stand a rotation of crops; but must be frequently laid down with grass seeds, and depastured with sheep. Some which is not good enough for that, must be used for rabbits: and there ought to be from five hundred to fifteen hundred acres of land for a rabbit-warren. These large farms are adapted to the breeding of horses and cattle, require a large capital, and suit men who are fond of hunting, shooting, and other rural diversions.

Where the land is only fit for grazing, and cannot be made more productive by the plough, it is of little consequence how large the farms are: but where the soil is of such a quality that by the ingenuity and industry

dustry of man it will produce from 10 $\ell$ . to  
 20 $\ell$ . per acre, and employ from four to six  
 people (men, women and children) in cul-  
 tivating every twenty acres; there is great  
 loss both individually and to the public if  
 the land is let in such a manner that one  
 man and his family manage two hundred  
 acres; which they may easily do if it be  
 left in grass. But if the land-owner be-  
 came sensible of its real value, and raised  
 the rent; it would soon give employment  
 to more people, and produce abundant  
 crops. The price of land, as of all other  
 things, would find its level; and gentle-  
 men who happen to possess these estates  
 might consider themselves as fortunate as if  
 actually in possession of a gold mine. At  
 present rent may be from 15s. to 1 $\ell$ . 5s.  
 per acre, and according to the common  
 management, great enough. The tenant,  
 if he makes from 2 $\ell$ . to 3 $\ell$ . per acre, is con-  
 tent; and from such produce is no great  
 gainer. Were the farmers in East Lothian  
 in Scotland to manage their land in this  
 way—one cow to four acres of land, two  
 ewes

ewes and lambs to an acre—there would be no paying the landlord 4*l.* per acre, though grain be there sold cheaper by 4*s.* per quarter. They have indeed five roods to an acre, labour is lower, and they pay no poor-rates; as the poor in general work for their living. Were good land scarce in England, a plot of it would be more highly valued. In Aberdeenshire, in Scotland, there is land let at from 3*l.* to 8*l.* per acre. The produce thereof is not more nor so much as that of a great many lands in England would be, were they cultivated in the same manner, and with equal industry. If the crops raised by improving such lands only maintained the poor without the present absurd poor-laws, it would save an immense sum of money now squandered on removals, lawyers' fees, doctors' bills, expences of officers, and now and then a good feast, which, in some parishes swallow up one half of the contributions levied on the inhabitants for the support of the poor. Where is the evil then to the farmer if he gives his landlord 4*l.* per acre for land, and

makes 20*l.* of it? He is as well off as the man that gives 2*l.* and makes 5*l.* per acre; and he is relieved from the heavy burthens for maintaining the poor; as the converting pastures into arable fields creates both work and meat for them.

In Scotland, the labouring people have little or no money for their labour. I do not like that: I would have every man to think himself independent by the fruits of his labour; for if the man thinks himself great, he really is so. The Scotch labourer has a cow and a pig kept, is allowed a certain quantity of wool, of flax, and of corn of different sorts, some land set with potatoes:—In fact, he is maintained like a horse or some animal for use; he will not want; but he has no opportunity to raise himself from his low station, and is therefore apt to leave his home and seek for independency, which he very frequently obtains—a great encouragement to emigration.

It is usual for the women in Scotland to reap the corn; and their allowance is one  
pint

pint of milk and one pint of oatmeal porridge in the morning, one pint of beer and a piece of bread at dinner, and at supper the same allowance as at breakfast, but no money. These customs may be derived from times when the produce could not be sold, and it suited the farmer to pay in kind : but even that is better than not employing the poor at all. The poor in Scotland are employed in spinning, &c. and they make their own clothing in the winter.

The poor in England, in time of harvest, go a-gleaning, which in fact is little better than going a-stealing ; for, when they gather corn amongst stooks, the temptation is almost too strong to refrain from taking from them—a very bad example for children. When inured young to these petty thefts, it has a material influence on their conduct during life. The first time a man does a dishonourable or unjust deed, he feels uncomfortable : but custom will make it easy to him. Now, it will become rather natural for the reaper to leave some corn when his wife and children are gleaning



after him upon the very land he has reaped; and his wife and children are allowed to glean because he is a reaper—a very just cause why they should not. This custom ought to be abolished; as it prevents the women in England from becoming reapers at 1s. or 1s. 6d. per day, when they can gather wheat to the amount of 3s. per day.

Respecting agreements or leases betwixt landlord and tenant, it is almost impossible to give any general rule. For small farms leases are less necessary; but a large one cannot well be let without a lease. Upon a small farm where land is good, a man's improvements soon come round: and if tenant and landlord disagree, either of them is easily accommodated; but upon a large farm it is quite the reverse. It would not be worth a man's while to fix himself upon a large scale for a year or two, and it would be attended with great expence and loss to move from any great distance with large quantities of stock for any short time. Besides, the plans of improvements upon a large  
farm

farm are more extensive, and it is longer before the money expended is refunded, especially upon poor land. But, undoubtedly, the tenant upon either a small or large farm ought to have a security for his property; and there ought to be an agreement to allow him a proportionate recompense for every improvement by which he has raised the land above nature—as by giving it more manure than could be made from the produce of the farm. When the manure produced upon the farm is the property of the farmer, and he is by the terms of his lease compelled to sell it to the coming tenant at a fair valuation, he often endeavours to make more manure the last year than any other; and by that means benefits the estate: if, on the contrary, he is not paid any thing for it, he will do every thing in his power to prevent any future improvement upon the farm, as from some cause or other he will fancy himself ill used upon leaving it. For all under-draining properly done, and for new buildings which were necessary for the farm, the tenant ought to

be allowed an indemnification proportionate to the number of years less than twenty he may have had the use of them. He should likewise receive an allowance for quick fences, the planting of orchards, or of aquatics and other useful trees in proper places, on producing fair bills, with receipts to them, of the expences—provided he leaves the estate without committing wilful wastes.

On the other hand, the landlord who enters into such a covenant with his tenant, may reasonably expect to have his farm re-delivered upon terms equally fair and reasonable. If the tenant has committed any waste, he should be obliged to make good all damages. Now such mutual conditions would do away many absurd restrictions now laid upon the tenant ; as it would be his interest not to injure the farm, because he must pay the landlord for damage wantonly done ; and the latter would have no reason to check the farmer's experiments and improvements,—to the great encouragement both of ingenuity and industry ; for gentlemen's

gentlemen's agents are very apt, from over anxious care of their lords' estates, to restrict tenants in such a manner that they are little better than an engine-horse, who can go over only a certain circle of ground. I have known an agreement made to lay a certain quantity of lime on land; where, if the land had been mine, I would have given more money than the lime cost that it might not have been laid on. Sometimes the farmer is tied down (not to mention many other disadvantageous modes of culture which the wisdom of the steward obliges him to follow) to plough and sow crops of corn only four years in six, and no turnips or clover.

As to restricting a man from ploughing up grass-land without leave, it is certainly proper until you see what use your new tenant makes of the land he does plough: but if he be industrious, and till well, I would suffer him to plough every inch if he chooses; as it certainly will in future make, upon good arable land, from one pound to three pounds per acre difference

in rent to the landlord. However, the nature and situation of the farm must be previously well considered.

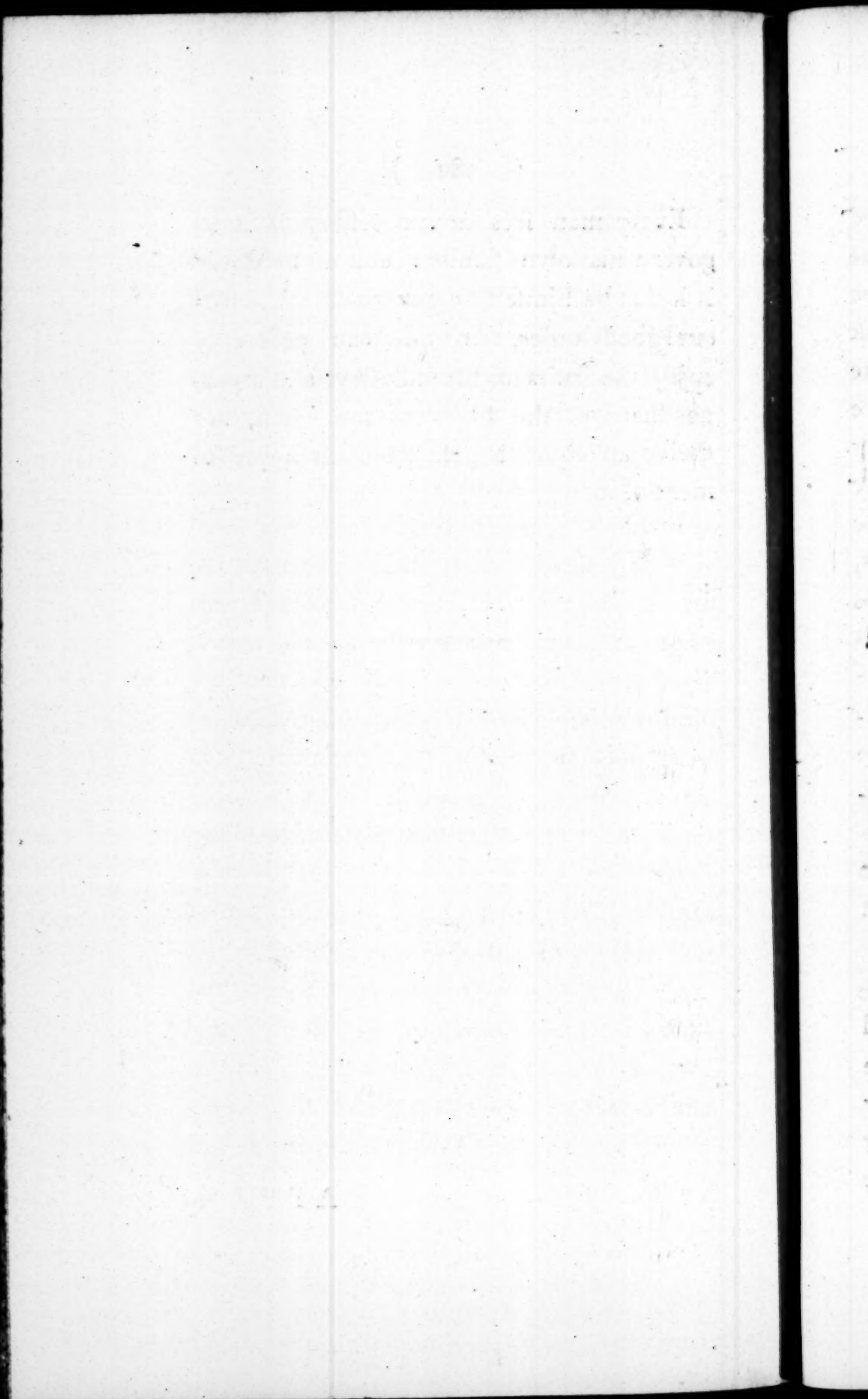
Having treated of the different modes and operations of farming according to the Prospectus, and in some instances added new matter, I beg to conclude with returning my grateful thanks to all such as have encouraged this Work. I have endeavoured to point out the method of putting the land of different qualities to its proper use; so as to add equal happiness to the rich and the poor, according to their respective situations in life. As to happiness, all honest and industrious men may enjoy an equal share with the great and noble; for I am persuaded that the man who assists in raising the fruits of the earth is more independent than he that consumes them; and if grandeur has its pleasures, it is frequently imbibed by numerous anxieties and disappointments.—As to the subordination of one sort of people to another, it is for the reciprocal good of the whole community.

Every



Every man sees how necessary it is to govern his own family: and as necessary is it that he himself be governed; as without good order, no one can peaceably enjoy the fruits of his industry, and a proper share of the fruits of the earth, nor derive an equal benefit from the improvement of it.

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## APPENDIX.

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### Nº I.

*Some Remarks concerning Paring and Burning—making Straw into Manure—and the proper Quantity of Seed to be sown.*

IN the course of this Work it may have been observed, that I seem in some instances to contradict myself. The cause is—there are no general rules without exceptions. For instance, I am very much attached to paring and burning, and, from my own observations and experiments, am convinced no injury can arise from it. Therefore I should pare and burn all sward-lands intended

intended to be ploughed up and converted into tillage, and the deeper it is burned the better; for which reason I should use the plough instead of the spade. I do not think it necessary, on old swards, to burn the fods down to a dead ash: but take care to burn the grass, and sufficiently smother the fods, so as that they might be properly pulverised. Thus would be destroyed the worms, grubs, &c. and likewise their eggs, or broods of young, so pernicious to crops of every kind.—But as this Work is intended for the use of all countries and all conditions, care is likewise taken to give directions, how to improve land where the tenant is restricted from paring and burning, viz. by ploughing up swards, and setting potatoes; as I give it as a rule by some means to pulverise the soil as soon as you can, after land is broke up.

My frequent repetitions in recommending the making straw into manure, and laying it on the land, may have struck some readers: these repetitions arose from my conviction of the great losses occasioned by

the too general neglect of that salutary practice.

I likewise repeatedly recommended great quantities of seed for all crops; for I do not recollect an instance of land being injured by too much manure, or a crop by too great a quantity of seed having been sown. I have, indeed, known a good crop from thin sowing. In one instance, where four Winchester bushels of barley had been sown broad-cast on four acres of land, the produce was twenty-four quarters, eight Winchester bushels to the quarter, delivered at the kiln: but I have since that time known five hundred instances to the contrary. A friend of mine once sowed twelve bushels of oats on one acre of land; and the produce amounted to fifteen quarters—the greatest I ever heard of. It is however possible to sow too much; but it comes so near to a man's pocket, that it rarely happens.

There have been many experiments tried with dibbling, drilling, and broad-cast; and the broad-cast has generally produced the most.



most. The cause is evident : more seed was sown by the broad-cast ; for by the broad-cast method the land is not rendered more fertile, nor is the seed more properly deposited in the ground : but there is more thrown upon it, and the land more generally covered.

## Nº II.

*Of the proper Manner of depositing the Seed of Wheat, Peas, Turnips, Rape, &c. in Drills, &c.*

ON revising the different Sections of the Work, I find I have given general directions for making drills ; but not for depositing the seed in them. It may therefore be necessary to acquaint the reader, that I have tried every method of depositing the corn in drills, and find the broad-cast the most correct. For, where the drills are made according to my directions, almost every

seed will fall in the proper place ; and the harrows, or thorn-harrow, will remove any chance grain that may remain on the ridge or side of the drill.

I have hitherto been a great advocate for the grains of the corn to be dispersed so that every one might fall single : but I have altered my opinion. I am now convinced, that if, in sowing the *winter* crops, four wheat-corns be put into the earth together in one hole, the crop would, on an average, be better in all seasons, than if the grains were divided, and covered the same space of ground separately. With respect to corn sown in the *spring*, I still firmly adhere to my former opinion. But the wheat sown in *autumn*, and destined to bear the vicissitudes and storms of winter, may be greatly benefited by growing in lumps or bunches, as the plants will thus mutually give and receive shelter and warmth. I first attended to the above circumstances last autumn, when at Mr. Coke's in Norfolk. On examining the ground that was then dibbled with wheat, I found in some holes  
 sixteen

sixteen grains, and in others only two. When I saw this, I concluded there would be many short heads of wheat. But during the day Mr. Coke ordered the threshers to throw a great many sheaves of wheat from the mow; and, to my very great surprise, I do not recollect seeing wheat with heads so fine and of so regular a size. I then made it my business to examine the *stubbles*: and in the stubble where apparently only one grain had fallen, I did not find that superior strength I had expected. During the winter I have made several observations in fields of wheat; and I frequently noticed that, where a single grain had fallen, the plant appeared weak and starved; but where three or four had fallen, the blades were fine, broad, healthy and vigorous. In like manner, clumps of trees in plantations get up much quicker than a single one: and I have often observed, that when plantations, after they have grown to from fifteen to twenty feet high, have been thinned, and the under branches lopped off, they make but slow progress after. Therefore

fore it appears very plainly, that trees growing in clumps shelter one another: and I am of opinion that wheat-plants similarly situated do the same. But I would not wish the reader to infer from what I have said above, that I approve of sixteen grains in one place; but only of four instead of one.

On drawing up the stubble, I have likewise discovered that wheat deposited deep tillers very little. I attribute this to the root's being too near the ramel or dead earth, so that it stands in a poor cold situation, has its food to seek upwards, and generally throws out another root near the surface.

In drill-peas, by thick sowing in the extreme (viz. four bushels instead of three) the peas will be six inches high, when in the drills sown with three bushels they will be only four inches high. I never procured however, on an average, a more abundant crop of peas by sowing thick. In sowing in drills tares to cut, or any other sort of

green fodder, it is necessary to sow very thick.

I am of opinion, I could dibble an acre of wheat to raise as much wheat as the land could bear: but, if the soil were good, I would set every three inches.

I approve of sowing the fallow-land under furrow; with a boy to deposit the seed, at 6*d.* per acre. This might be done by the drill-plough: but the boy would do it better and cheaper; for the delay in the ploughman filling the hopper, and the stoppages he would undergo on that account, would prevent more labour than the boy's wages would come to. It will probably be said, Where are these women and boys to be got; and who is to teach them all these things? I answer: A well regulated farm should be like a good school. If proper regularity were established in farming, the boys would teach one another, and the master have much less trouble than he who does not attend to any regular method. For instance, the school-master who has

twenty



twenty boys, and has them to beat continually, works very hard. So does the irregular farmer. I saw a farmer in the month of August last, one very hot morning, by five o'clock, stripped to his shirt stubbing up thistles with a hoe, to make way for the plough; they having grown so strong, that the plough could not pass for them. The farmer being pressed hard by the ploughman, I do not recollect seeing a man work harder. The thistles were full of seed. Therefore there was little doubt of his having a succeeding crop. So it might be truly said, the farmer had got his work set.

N<sup>o</sup> III.*Of the Smut in Wheat.*

FROM the experiments detailed in Section IX. of the foregoing Work, it plainly appears that smut arises from a defect in the seed. The following is an additional proof. In the year 1793, I sowed on a piece of land seed which I had procured from Burill in Cambridgeshire, and the produce proved smutty. It having cost a very high price, I sowed the produce the year following. I chamberleyed one part, and prepared another with arsenic-water; but, the day we finished, I ordered to sow one land without the preparation. The part of the field sown with wheat prepared was entirely free from smut, and the other part very much affected indeed.

N<sup>o</sup> IV.*Of preserving Sheep from the Rot.*

IT is necessary to observe, that in wet seasons, or on any suspicious grounds, when sheep are more liable to be attacked with the rot, it is very dangerous to keep changing them about—a practice very general in some parts of the kingdom. The less they are moved the better. When you put as many sheep into six acres as sixty would keep for a continuance; it obliges them to eat every part of so small a pasture: and when land is perfectly sound and dry, I doubt not its being equally profitable—perhaps more so. But if land be wet, that cannot be the case; as such a number will tread it to dirt in a very little time. I have reason to believe that sheep, by nature, do not choose to eat land in parts

- which cause the rot. The rot, indeed, is more frequently occasioned by scanty pastures—not but there are some lands would rot in almost any part of the pasture. For want of proper divisions being made, thousands of sheep are destroyed by the rot; as the greater part of the pasture is perfectly sound, and some swampy part is the cause of the disease.

N<sup>o</sup> V.*Some general Directions relative to the Planting of Trees.*

I HAD thought it unnecessary to say any thing concerning planting, in a Work intended for the practical farmer: but being requested by some gentlemen who have been so good as to patronize my undertaking, to publish what observations I may have made on that subject; I submit the following  
short

short and general directions to the consideration of the reader.

The land ought, if in grass, to be pulverized by paring and burning, and set with potatoes, so that, the earth being loosened, the roots of the young trees may spread themselves in proper directions, both as to space of ground and the food required for their support. It is necessary to observe that, when a tree is first planted, were it rammed about like a post, its progress would be impeded. Therefore cattle ought not to be suffered to depasture and tread the ground round young trees; for their roots will not admit of much weight of any sort. Consequently the soil ought to be pulverized for a space of years, sufficient for the tree to push forth all its ramifications in such a manner as nature directs.

Trees ought not to be planted deep: but it is impossible to give particular directions as to the proper depth; as so much depends on the soil and the size of the trees.



Trees intended to bear fruit ought not to have a tap-root, which should be destroyed by cutting it off. It is a very good way to lay a few bricks like a floor at the bottom of every fruit-tree, and round the bricks some rubbish (such as old bricks broken in pieces) to keep the land light about the roots, so that they may freely spread out laterally to seek their food. No tree having a tap-root will be productive in fruit. On the contrary, in trees intended for timber the tap-root ought to be preserved, and encouraged as much as possible. In every other respect they should be treated as fruit-trees, except the bricking at the bottom.

Trees of every description ought to be well sheltered. Shelter is as necessary to young trees as food. We well know from practice and observation, that clumps of trees get up much quicker than single trees, on spots where the soil is of equal goodness. Likewise in the seedling-bed I would raise a great many more than I intended to plant,

plant, and only set the best; as I have generally found the best plants on the seedling-bed ever after to retain their superiority: and had I trees to buy, I had rather have the first or largest trees from the seedling-bed for their price, than the culls or the after-drawing for nothing. This observation holds good with respect to every thing I have practised.

#### N° VI.

##### *Description of a Churn not in general use.*

THIS churn is at present made oblong, and the dashes are three in number, with holes in them. But I am of opinion, that if the churn were a long square, from two to three feet wide, and from four to five feet long, it would answer the purpose better, and at a much smaller expence—The dashes to be slips of board with holes in them

them about an inch in diameter: The boards should be from four to six inches broad, and the length proportioned to the length of the churn. These boards to be so fixed, as, in turning round, to move every part of the cream twice. To do this, the middle piece or axle-tree must have eight sides, and slots driven through them. Dashes of this sort would not carry the butter round with them; but would leave it in the corners, so that the churn might be worked with greater ease. This churn stands still, and the dashes turn within the churn like a grindstone. To effect this, two pieces of wood must be fixed in the inside of the churn, for the irons or gougings to turn on. In the inside of the churn there must be fixed a piece of iron, against which the end of the gouging is closely pressed in fixing the handle. Without this precaution the cream will run out, when you fill the churn as high as the axle. There must be a female screw in the inside of the gouging; and the handle you turn the dashes by must be screwed into it, on the  
outside,

outside, so as to draw the gouging-end so close as to prevent the cream from running out. The principal advantage arising from the use of the churn described above is, that you may give it air so as to prevent the flowing of the cream, which often spoils the taste of the butter, and likewise greatly increases the labour, and retards the operation.

There are other conveniences attending the use of these churns. As they are entirely open at the top, the dash may be taken out, and the whole machine kept quite clean and sweet. And by fixing a wheel on the outside, like that of a malt-mill or of the fan used for winnowing corn, great quantities of cream might be churned by one person.

The taste of the butter made from cream taken from milk of cows that have eaten turnips, or any other strong food, is exceedingly disagreeable.

I have, since writing that part of the foregoing Work which treats of the management of the dairy, found out, that if the  
butter-

butter milk be kept until it be four, and put into the churn in the proportion of about one third of the four butter-milk to two of the new cream, it will remove the unpleasant taste, and moreover cause the butter to come sooner, and in greater abundance.

N° VII.

*Description of Mr. Sanxter's Plough for  
Paring of Land—and its Uses.*

BEING lately at Horseheath, I called on Mr. Sanxter, an ingenious farmer of that place, to view his newly invented plough for paring land which is to be burned. The operation of paring was formerly performed by men, by what is termed breast-ploughing: but the work is done much better and quicker by Mr. Sanxter's machine. He is now soliciting a patent for it: and from the trial I saw made of it, I am so convinced of its  
great



great utility, that I take the liberty to recommend it to all those engaged in agriculture. The plough is very simple in its construction, and will do its work with one good horse and a man. It will pare a sod from nine inches to fifteen inches width, as the ploughman chooses. An industrious ploughman might pare with it two acres per day; but I should not attempt that, as, the furrows being narrower, the plough may be made to set great part of the sods upon the edge; which will cause them to dry more quickly, and burn the better. Although some of the sods may fall with the grass-side upwards, there will be a sufficiency to begin the fires with; and when the heaps burn strongly, some of the less dry sods may be gradually added, and will in turn be reduced to ashes. It is the opinion of some, that it would be better if the sods could be only smoked and singed. Of this I am not certain. On the contrary, I know from experience that burning earth of any description makes it more fertile. By weighing earth, then  
burning

burning it, and afterwards laying it in the open air, it has been found that it retained its former weight; and when the earth has been laid on land to burn, it makes that spot of ground remarkably productive. One great objection to paring and burning has hitherto been, the expence and labour attending it. But with Mr. Sanxter's plough you may quickly and cheaply pare a number of acres of land—and that at the proper time for doing the work. At present, from the frequent want of men who are able to pare, you must wait until they have finished some other farmer's field, and sometimes lose the season for the intended crop.

Another advantage of Mr. Sanxter's plough is, that you may cut the furrows what depth you like; for she acts like a joiner's plane. Indeed I know of no objection to her, but that she cannot be worked so easily on unlevel land, such as where large ant-hills are. Such as are of a moderate size may be ploughed up with a common plough; which I like better than another machine of a more complex construction,

tion, which Mr. Sanxter has invented to cut them up: for the pressure or power being so very great, it is likely to put the ant-hill plough out of order; and then the fods are obliged to be cut or chopped in pieces by men, before they can be moved. But I should act differently with the land that is full of ant-hills. I should pare it with Mr. Sanxter's paring-plough as well as I could, and then take a common plough and plough the ant-hills off, and burn them with the fods, or more properly after the fods are burnt, throwing them into the hot ashes, which will be found of essential use, and the expence is but small. The harder the land, the better the paring plough does her work. The reason is, as she rests on a foot to give the depth, if the land bend and deceive the foot, the plough will not take hold: but when all the land is soft alike, it is of no consequence.

Now, after mentioning some of the great uses of this plough for paring and burning, it may not be unnecessary to remind the reader of my method of cleaning  
 stubble-

stubble-fields, where this plough will become even of more general utility than in paring sward-lands. Instead of mowing wheat-stubble, you may with this plough cut it at one operation ; and if the season be dry, it may be burnt. But I very much approve of my former method of leading stubble off and making manure of all the refuse stuff. All stubbles from white crops ought, the first ploughing, to be ploughed with the paring plough ; and all drill-crops with the scarifier, the first operation.

I have been trying at a plough of this kind for some time, but never could obtain it. The expence of the plough will be four guineas ; and if by chance any part breaks, it is very easy to repair it. It may be asked, If the plough be so simple, why so high a price ? I answer : The obtaining a patent is attended with great expence ; and a man ought to be allowed some recompense for his ingenuity.

N<sup>o</sup> VIII.*How to cure Corns in Horses' Feet.*

I OBSERVE that I have neglected to give directions how to cure horses afflicted with corns. The reader, then, will be pleased to take notice, that it is done by keeping the feet moist, and shoeing them in such a manner that the shoe may not press on the part affected; for corns are caused by a bruise, and become worse and worse from repetitions of the same cause. The moister the feet are kept, the better; as a horse's hoof grows so very quickly as to confine the bruised part, and cause it to fester; and the matter will break out at the top of the hoof, if vent be not given it below by paring properly out; which part of the process is known by every blacksmith. It is only necessary to cut off with a paring-



knife the part aggrieved, which is at the corner of the heel, so as to get it near the quick, but not to raise any blood. That done, cut off the outside of the hoof in a slanting manner, so that the corner may not bear any weight by the shoe resting upon it. Very great care must be taken to pare the outside of the hoof to a great nicety, so that the end or the corner of the shoe press not upon the sore or bruised part. By attending to the above, I have worked a cure of very bad corns. By shoeing in the manner I have directed, no stones or dirt can lodge in the sore part.

I found out this cause and cure of corns from having them on my own feet. By taking care to let no weight press upon, them they became easy, and at last went totally away. I got them by holding sheep by the head betwixt my knees. The sheep struggled and trod on my toes, and the bruised parts were affected with corns.

N<sup>o</sup> IX.*Thoughts on the Use of the Sow-thistle—  
Description of a remarkably fat Sheep.*

I HAVE not written upon Cichory, which is used as green food for animals, and very profitable for the purpose; but it will not make hay to profit. I am indeed of opinion, that other weeds, if grown and used as green food, would be as profitable as cichory; but not having had an opportunity to try the experiment, and having through the whole of this Work laid it down as a rule to give nothing to the public but what I have myself experienced and used, I omitted to mention many probable improvements. I cannot, however, refrain from saying a few words respecting the sow-thistle, so common in all worn-out lands, and a very obnoxious weed in what is termed run crops. It has often

struck my mind, that, on account of its milky nature, it would become one of the most fattening plants the earth produces, were it properly cultivated. When taken young, and cut or broken, it produces something like cream; and I have observed many animals to like it in preference to every other plant now in vogue. Sheep when in clovers, &c. will feed upon it so greedily as to eat the very roots. Pigs likewise prefer it to almost any other green food. Rabbits will breed more speedily when fed with fow-thistles, than with any other food I know of, except dandelion; which is of the same nature, and is now sold in Covent-Garden market to the breeders of tame rabbits, to make them take the buck more readily. A man of my acquaintance, who was allowed better skill with stallions than the general part of mankind, used to search for fow-thistles and give to his horse to make him serve mares more readily. When he could not procure fow-thistles, he fed him with new-laid eggs and milk, or cream if he could  
get

get it; but preferred sow-thistles or dandelion.

We have a well-known and decisive proof of the nutritive properties of the sow-thistle, in the fat wether-sheep fed to an amazing size by Mr. Trimnel, of Bicker Fen, near Boston, Lincolnshire, upon fen land. This sheep was bred by Mr. Hutchinson, in Hail Fen, from a ram bred by Mr. Robinson of Kirkby, near Sleaford.

He never ate any corn, oil-cake, &c. but fed wholly upon grass and herbage. Being turned with many other sheep into a field of clover, this sheep was observed first to search for the sow-thistles, and would eat no other food whilst any of them could be found in the part of the field that was hurdled off successively, a little at a time. None of the other sheep that fed with him shewed any liking for the sow-thistle. A small hut was erected for him in the field, to repose under in hot weather; and when the part that was hurdled off became bare of food, his attendants (being guided by his propensity for sow-thistles)

gathered a quantity for him, of which they gave him, at stated hours, three times a day, from two to five pounds at a meal.

Standing on his feet, he measured only two feet six inches high: he was weighed once a month, and weighed alive twenty-six stone, at fourteen pounds to the stone. He gained only one pound the last month. As it was thence concluded that he had got to the top and was quite ripe, and might possibly lose weight the next month, he was killed on the 13th day of October, 1791, by Mr. Isaac Lumby, of Bicker, being then a four-shear, or four-year-old sheep.

The skin, hung up by the nose, measured ten feet two inches, from the point of the nose to the tip of the tail, and was sold for seven shillings and six-pence in the common course of business.

The carcase measured five feet, from the nose to the tail; the rump or cushion eight inches and a half in depth; plate or fore-flank the same thickness; breast  
end



end seven inches ; one yard five inches and a half round the collar, and weighed sixty-seven pounds a quarter, Avoirdupoise weight.

The legs were estimated at forty pounds weight each ; but, if cut haunch of venison fashion, would have weighed fifty pounds each ; for which the proprietor, Mr. Lumby, was offered two shillings a pound ; so that the two legs only would have brought ten pounds.

#### Nº X.

#### *Of the Advantages arising from keeping Bees.*

HONEY-BEES are worth every person's attention ; as their produce arises from a part of the produce of the land which cannot be made profitable by any other means, (viz. the blossom of every plant in the meadows, the blossom of every sort of grain,

X 4

and

and the flowers in the garden), and might be brought to a very considerable value; especially now sugars are at such an enormous price. For the management of bees, I refer the reader to Mr. Wildman's treatise, in which he will find every necessary direction.

Bees ought to be set near to their food, viz. the sort of food they like best; and moved from time to time as their food gets ready; such as rape first, clover next, then beans, and buck-wheat last. My reason for particularly remarking this is: A gentleman of veracity, who had a great number of bees, told me that he observed them to leave their home early in the morning, and not to be seen all day. It was in the time of beans being in blossom. There was a large field of beans many miles from him; and remembering bees to be in great numbers in bean-fields, it struck him he would dredge them with flour as they came out of the hive. He did so, and rode to this bean-field, and there discovered a number of his bees. Now, it is easy to conceive, that to these

these industrious creatures, which spend no time in idleness, it must make a very essential difference in the gathering of the honey, wax, &c. to be able to fly only once a day many miles, instead of having the necessary materials at their door. What numberless misfortunes may happen to them, when returning home heavy laden, from heavy showers of rain, from hail, high winds, &c. which are very destructive to thousands of them ! The one part of the day may be rainy, the other fine. Now, if their food was at home, they would readily go out and fetch what they want ; but when at a great distance, it is impossible.

Every thing that is sweet to the smell is found to be what they delight in, such as mignonette, lavender, and every sweet flower you can think of. Where bees are kept, a garden of flowers becomes of great value. Indeed, the management of bees would be an amusement to many hundreds of people who are at a loss to know how to spend their time ; for the management of the garden, by raising flowers of the most  
early

early and latest kind, gathering the seeds, and sowing, planting, and transplanting, &c. would make the employment continual, like the management of a farm. Then how delightful it is to see these industrious creatures at work; which you may easily do by having a flat-topped hive, with a slider! As the bees always fill the upper part of the hive first; if you draw the slider, and set a glass over the opening, you may keep taking away honey by small quantities, until such time as it is necessary that the bees begin to lay it up for the winter. I have heard Mr. Wildman say, he has taken seventy pounds of honey from one hive of bees during the summer; and they have had a sufficiency for themselves. Mr. Wildman sells his honey at 3s. per pound. What immense sums of money might be raised by these industrious animals, and by a set of people who are at a loss to kill time, and assist neither in agriculture nor our manufactures! Great part of them are much addicted to two things I dislike—tea and scandal—the other part to tea and theft—  
 pilfering

pilfering their neighbour's hedges, orchards, hen's nests, &c. Now, I am of opinion there is useful employment for every description of people ; and when a person says he has nothing to do, the more shame for him ! The taxes are daily complained of. Does not the reader think the honey-bees would pay a considerable proportional part ? I can only say I am sorry for those who will not attempt to reach the summit of a hill that only appears high.

THE END.



# ERRATA.

## VOL. I.

- P. 243, l. 4, for *follow them practice*, read *follow them in practice*.  
 288, l. 22, for 1792, read 1791.

## VOL. II.

- P. 74, l. 17, after *scarcest*, add *of food*.  
 126, l. 4, The Plate referred to could not be got ready to be published along with the Work.  
 142, l. 13, for *have it put*, read *have it bound in sheaves and put*.  
 161, l. 7, for *sides*, read *sites*.  
 169, l. 5, for *If the disease be not*, read *As the disease is not*.  
 190, l. 5, for *dust*, read *dirt*.  
 230, l. 9, after *except* add *many of*.  
 255, l. 18, for *9d.* read *7d.*

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